AMERICAN PUBLIC HEALTH PROTECTION

HENRY B. HEMENWAY

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By

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THE LEGAL PRINCIPLES OF PUBLIC HEALTH ADMINISTRATION, ETC.

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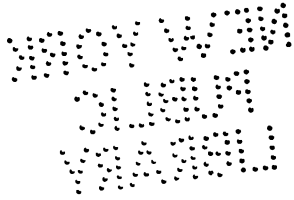

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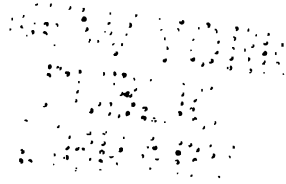
Hoping Thus to Aid Them in Protecting the Lives of
Their Children



PREFACE

"How can we arouse the people to a realization of their selfish interest in efficient public health administration?"

"How can they be made to see that this does not mean the enactment of many statutes and ordinances, but the employment of specially trained executives?"

These questions have been asked by university professors and by officers of health in several states. The following pages have been written partly in answer to these appeals. The book bears a message to every citizen: health administration must be divorced from politics, and recognized as a special profession.

This offering is dedicated to the Women of America, as "the power behind the throne." In the past they have done much to assist in securing better conditions; but amateur sanitarians should not themselves attempt to determine administrative policies or legislative provisions. In the place of trying to decide how dairies

should be managed they should make sure that a competent health officer is employed, and then follow his leading.

When, therefore, the women become alive to the fact that the very lives of their children depend more on the selection of competent watchmen of health than on rules and regulations, then fundamental changes will be made in governmental activities. When they see the inherent antagonism between private medical practise and public health preservation the women will bring such pressure to bear that no health officer will attempt to engage in private practise. When they comprehend that one dollar spent in the training of sanitarians will do more toward lessening human suffering than ten spent in the support of hospitals, they will use their influence to secure suitable endowments for schools giving this instruction. When they realize the intimate relationship that exists between disease, poverty, sin, suffering and death, they will also comprehend the additional fact that the true work of the

Christian church will be better done if some of the money now reverently laid upon her altars be diverted to the support of efficient health administration.

While the type of this book was being set, Doctor Charles W. Stiles, of the United States Public Health Service, gave an address before the Indiana Sanitary and Water Supply Association at Indianapolis. He closed with the following idea: There are annually in the United States about 620,000 deaths from preventive disease. Most of those deaths represent infants and young people. It is difficult to get up any sympathy really for the children or even adults who, by their untimely deaths, have, at the most, simply lost future possibilities of activity in this world. The real sorrow should be for those who are affected by these deaths. Those 620,000 deaths represent 475,000 years of pregnancy of the mothers; it represents 600,000 years more of the care for the nursing infant; it represents 620,000 times that the women have been forced to undergo the

trials and dangers of confinement; and these deaths make all those sufferings and trials and cares to such degree useless. There is a popular idea in the South that men should protect women from temporary dangers. How much more important is it that their chivalry should be made to extend to the prevention of unnecessary sickness, suffering and death!

I wish to express my obligation to Dean C. R. Bardeen and Professor Paul F. Clark, of the University of Wisconsin, who read my manuscript and made suggestions, and to the Honorable Sir Joseph Pope, who kindly furnished me with copies of the speeches of Sir John Macdonald, from which abstracts have been taken.

H. B. H.

CONTENTS

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CHAPTER I

INTRODUCTION

It should require no argument to convince a person that his financial status must vary with his health, other things being equal. If his health is good, if his muscles are strong and his nerve supply is abundant and well trained, he is enabled to work long and hard. If he chances to be in only moderately good health, if he is troubled with indigestion, for example, he can not accomplish so much work, and it is likely to be of inferior quality. The imperfectly digested food undergoes fermentive or putrefactive changes, and the system becomes loaded with poisons. The brain may become directly poisoned thereby, and the symptoms may be lessened certainty of action, or the pro-

duction of pain; or the attention of the mind may be distracted by the pain produced by the gaseous distention of the intestines. Any of these conditions decreases the man's efficiency. With more serious illness he may be forced to stop work entirely.

In more serious illness the loss is not measured by the patient's decrease in efficiency, for his efficiency has dropped to a negative quantity. He requires the attention of another person who is thereby hindered from doing really productive work. So the patient must pay for the services of a doctor, a nurse and other assistants, as well as for special articles of merchandise needed only because of his sickness, such as drugs and sick-room necessities. It must also be remembered that in serious cases of illness the loss to the family may often be still greater, as a result of the distraction of the attention of other members from their own work, and from the inability of the patient to care for business of which he alone knows the details.

It would be a matter of economy, were i

possible, for the patient to pay the doctor and the nurse and the druggist the full amount of their bills, and keep his health. To a degree this course is being pursued by some to-day. They are going to their physicians at regular periods for physical examinations and advice. In the past it has often happened that the first warning of serious disease has come when an applicant for life insurance took his physical examination, but too frequently the warning has been disregarded until too late. Such examinations, however, are personal matters, and their results are almost exclusively indications for personal hygiene. They have little bearing upon the prevention of infectious diseases, especially those scourges that invade a community almost without warning, and leave chronic invalids and corpses where they find happy people.

Where the same cause is liable to produce illness in an entire community, and that cause is external to those made ill, protection is a community problem, and should be handled by the agent of the district interested. Efficiency

of administration here is also a financial economy, and bears a direct relationship to the prosperity of the area. Sometimes the administration may be managed by a private corporation, and at others by governmental authority. The results are similar, and if equally efficient it does not matter greatly by whom the efforts are exerted.

Aside from the saving of lives, and in health of returned workmen, General Gorgas, in his *Sanitation in Panama,* estimates that the sanitary service on the Canal Zone saved to the United States at least $80,000,000 in the cost of digging the canal. Further, it is generally recognized that it was only as a result of the discovery of the means by which yellow fever and malaria are spread, and the application of that knowledge by the staff of General Gorgas in preventing those plagues, that it was possible to complete the canal construction.

Trade from eastern Bolivia reaches the outside world chiefly by passing down the Madeira and Amazon Rivers. Ocean-going steamships from Liverpool and New York

can sail 900 miles up the Amazon to the mouth of the Madeira, and then 660 miles up the latter stream to Port San Antonio. There they are stopped by rapids, but 200 miles farther up the streams again become navigable for long distances. Formerly freight and boats had to be portaged many times in that 200 miles of rapids, except during high water. The result was not only great labor and expense, but frequent loss of cargo and life. In 1871 an attempt was made to construct a railroad by those rapids, but so great were the obstacles, especially in the matter of disease, that the work was abandoned. So important did the project seem that Bolivia made the construction of that road one of the terms in the cession of the Acre territory to Brazil, and in 1878 another attempt was made. After constructing some four miles of track, and grading a little farther, the engineers were again driven off by disease. However, seeing the results at Panama, an American firm in 1909 assumed the task, and by the aid of a sanitary department were enabled to construct the Madeira-

Mamoré railroad, and put it in operation. Its value may be somewhat appreciated from the fact that shippers were willing to pay at the rate of $150 a ton for the transportation of rubber over the 210 miles of its track. Here again the successful construction of the work was dependent upon the sanitary administration.

Adams, in his *Conquest of the Tropics,* tells us that when Minor C. Keith began his railroad construction for the United Fruit Company in Costa Rica he lost 4,000 men by death in the construction of his first twenty-five miles of road. Before the United States acquired the Canal Zone this company realized the importance of employing expert sanitarians. The demand could not be supplied in this country, so the company imported sanitarians from Java and from India. It also assisted in founding the School of Tropical Medicine at Tulane University in New Orleans. They were forced to do this because of their extensive interests in tropical countries, and on accoun of the inefficiency of governmental sanitation

Now when the company is about to open up new territory it begins by sending its sanitary corps. In 1913 it opened up a section of Honduras which was denounced by the natives as such a pesthole that it was useless to attempt its cultivation. That year the company constructed 250 miles of railroad, built temporary piers, offices and warehouses, and began the planting of 50,000 acres of bananas, "and the health of the thousands of men employed is as good as that of the average farming community in the United States." That year their hospitals in Guatemala showed a mortality of only 2.57 per cent., and there was not a case of quarantinable disease in any port where the company operated, nor on any of its ships.

It must be remembered that if there be a sick rate of fifty per cent., a company must support double the number of hands that it needs for work. This materially increases the expense of operation. On the sugar plantations of British Guiana, for example, it was found that within the four years ending in 1909 there had been 39,000 cases of hookworm treated.

This disease is indirectly the cause of mortality from other diseases, and itself causes a heavy loss of efficiency in labor. In our own southern states this infection has been a great cause of dependency. After treatment it is found that families who have always been more or less dependent upon the community become self-supporting, and even begin to acquire property.

Whenever a large proportion of a community is incapacitated for labor on account of sickness, the economic production of that territory is decreased. If it be an agricultural section, it raises less for shipment. If it sells less to the outside world it must buy less. This means that the transportation companies serving it do less business, and the merchants are less flourishing. However, with less income, the working population is directly and indirectly more heavily taxed to support those who are unable to support themselves.

It is not agricultural or tropical sections alone which are thus punished by inefficient protection of the community health. Before

the opening of the Sanitary Canal, Chicago had a typhoid death rate of 175; now it is less than ten. This change is not the result of the canal alone, but many other factors enter into the case, such as supervision of the milk supply, restriction of fly infection, etc. The reduction in typhoid is always accompanied by a reduction in other diseases, especially intestinal infections. Did the old typhoid rate still exist, with the increased population the city would now lose about 3,300 more typhoid patients than it does at present. This is a disease of early maturity, and its victims are among the most productive workers. Each life is therefore worth at least $3,000 on an average. That means that the lives now saved from this form of infection save to the community nearly $10,000,000 a year. In addition there is the saving of some 33,000 cases of the disease, and the expense of the care of those cases (making no account of the wages saved by enabling the patients to keep at work), would amount to from $5,000,000 to $10,000,000 more.

Similar figures might easily be found in any

portion of the nation, and for many different diseases. In five weeks of 1907 there were reported to the Chicago Health Department 4,048 cases of scarlet fever. According to the rate for the previous five weeks there would have been only 675. The increase was due to infection received through a certain milk supply, and that same infection was evidently responsible even for much of the fever of the previous weeks, as well as for a like epidemic in the suburbs. That milk was shipped in from a neighboring state. A few years ago in Stamford, Connecticut, there was an epidemic of typhoid fever. Of the 386 cases 352, or 91.2 per cent., were in houses supplied by one milk dealer, besides twelve more who were known to have used his milk in a café, and four others who had obtained milk from him indirectly, making a total of 368, or 95.3 per cent., of cases directly traced to that one supply.

While it might be possible for a wide-awake medical practitioner in a small country community to guard his patrons from such an infection, it is a manifest impossibility for the

family physician practising in a metropolitan community to render such service. It therefore follows that this duty must be performed by some united effort, as through some governmental authority. Since a portion of this service is of local interest only, or chiefly, it must devolve upon the local government. But the city officer has no authority outside of his jurisdiction. Hence other portions of the work must be performed by state or national officers.

A man may so construct his house that it will be fireproof, and that he may by his own efforts protect it against housebreakers. Personal violence is open, easy to anticipate and to guard against. Infectious diseases approach stealthily, and work their injury before their presence is suspected. It is therefore a practical impossibility even for a rich man efficiently to protect himself and his family from such an enemy. On the other hand, protection of the inmates of the palace includes efficient protection of the slums. It is among the crowded tenements, filled with poorly nourished and overworked dwellers, that infectious

fires find their tinder, and from these hovels they sweep to the mansions.

While sickness in the family of the rich may mean added expense, pain, suffering and disarrangement of plans, in the humble homes it threatens financial ruin. It stops wages, increases expenses, sweeps away all reserve capital, and makes the self-respecting mechanic a dependent pauper. Not seldom it leaves the family in such a physical condition that they will never be able to escape from the thraldom of poverty.

Though originally public health service was a very minor branch of governmental work, today there is no department of governmental management which exerts an influence that more closely touches the life of every citizen. An efficient service means increased efficiency for the community. It means a decrease of poverty and of crime. It means a reduction in needless taxation for the support of criminals and paupers, and for the maintenance of hospitals. It means the saving of expenditure for medical and nursing services for many fam

ilies. It is of vital interest therefore for every citizen that the particular health department supervising his home shall be as efficient as possible.

Efficiency of such service is not measured by the number of men employed, nor by the amount of time consumed nor of money spent. Some years ago the executive of a certain board of health attempted to answer criticisms by pointing to the unusually large number of inspectors employed, and to his own slavish faithfulness at his work. In fact, much of the work there done was useless, and sometimes it was positively harmful. There was not a single sanitarian connected with the entire board, or any of its work.

Before the discovery in 1900 that yellow fever was only communicated by the bite of the stegomyia all efforts at the restriction of the disease were disappointing. While the board of army surgeons were pursuing their laboratory investigations in Havana, Gorgas was putting their ideas to test, and the result was that Havana was cleared of yellow fever

and of malaria. Then Gorgas was sent to the Canal Zone. With him there were Carter, of the Marine Hospital Service, another eminent pioneer investigator, and Ross, of the Navy, who had been with Gorgas in the work at Havana. Gorgas and Carter did not use the methods which others had used without much effect. Criticisms arose, and a strong protest at the "foolish squandering of money" by Gorgas and his associates. There was a demand that they be recalled, and that a certain sanitarian of the old style be appointed. Fortunately the president knew what had been accomplished in Cuba, and he refused to make the desired change. Had he listened to the demands it is probable that the present Surgeon-General of the American Army would have gone to his grave discredited and practically unknown, and that the Panama Canal would not yet be completed. There is no reason for thinking that the American engineers would have been more successful than their French predecessors. The man selected to take the place of Gorgas may have been a fine ad-

ministrator and a competent physician, but he did not know how to deal with either malaria or yellow fever.

It very frequently happens that enthusiastic amateur sanitarians, seeing partially some phase of a subject, secure ordinances which may actually hinder health protection. More frequently they are carried away by adherence to technicalities of no importance, and neglect the "weightier matters." For example: A certain official brought action against the owner of a grocery on the ground that the water-closet was in a room opening into the store. It was in a room well lighted and perfectly ventilated into the outside air, and the room was clean and thoroughly sanitary. Near by was another grocery in which the closet had been placed under instructions from the health department. It was in a dark basement, away from the outside air, and was enclosed by a board partition which neither reached to the floor nor to the ceiling "to provide good ventilation." The first closet was in a room walled off with a regular partition, plastered on both sides, and with a tight-closing door.

It is this kind of an official who is satisfied if a manure pit be emptied (not *cleaned*) weekly, though the flies may be breeding by the million in the manure littered around the box, or in the bottom which is never swept. Such an official may be very careful in observing the minute details of ordinances and regulations relative to the conduct of markets, groceries, soda fountains, bakeries and restaurants, and rate down an establishment in which there are many flies; while at the same time he overlooks the small and inconspicuous pile of manure by a neighboring blacksmith shop where the flies are bred. It is a practical impossibility to keep flies out of a restaurant kitchen while they are bred by the millions two hundred feet away. The swarms around the garbage can attract attention; but the real danger is in the straw and manure where they are bred, not where they eat after they have been bred. These officers are faithful and earnest, but the trouble is that they do not know how to do efficient work.

If a citizen needs the services of a chauffeur

he makes sure that his man knows about automobiles. He does not select a gardener to do his painting, nor a clerk to manage his factory. Strange as it may seem, however, that same citizen assists in securing the appointment of anybody to any kind of an office, simply because the appointee is a good fellow, or a congenial neighbor. More frequently he is satisfied with casting his ballot at the election, and then pays no attention to the city or state government until the next election, or until some trouble arises. Sometimes, without knowing why exactly, he is loud in criticism of mismanagement. There was great criticism of Gorgas at Panama, but the critics have hung their heads in shame since then.

Common business sense would suggest when a matter concerns a citizen in every phase of his life, when his financial status may depend upon it, when the very existence of his family may be closely connected with it, that he should at least give it some consideration. He should know something of its nature, its problems, and of their solution. As we have stated be-

fore, there is no other phase of governmental activity which so vitally touches every citizen as does the health department. It is to tell what a health department is and should be that this little book is written. While it may seem best occasionally to refer to the solution of some sanitary problems, it is not intended to give a manual on hygiene. There are plenty of such.

There is another reason for such an outline as this. Intelligent sanitation to-day is radically different from that of fifteen or twenty years ago. The science of public health may be said to have been born in 1898. It was then that the relation of insects to infectious diseases was first fully recognized, and the measures taken for protection were changed. Before that time cases of yellow fever were rigidly isolated and often cruelly abandoned. Fences were built around infected houses, but the disease swept on, unheeding the defenses. Now such cases are handled without danger to the attendants, and the disease is easily stamped out. The last epidemic of yellow fever in New

Orleans probably cost the city $20,000,000, according to the estimate of Surgeon White who had charge of its extermination. Yellow Jack will never again gain a foothold in this country. Could united effort be enlisted this malady could be made as rare as the great auk. The same is true of many other plagues which in the past have wrought devastation, but to attain these results the efforts must be guided by trained sanitarians.

There is a popular idea that physicians have the needed education. This is not true. Public health, as we know it to-day, is practically untaught in medical schools. The best training in the past has been given in schools of engineering, such as the Massachusetts Institute of Technology. Now at Harvard, at the Universities of Wisconsin, Minnesota, Ohio and Michigan, and at Washington University at St. Louis, courses in public health are being given in a very imperfect way. They would be given more satisfactorily if more students offered themselves for the course. More students would willingly apply if they had any

assurance that they could put their training to use in self-support. It is only as a result of the recognition of the true state of the matter by citizens generally that such a demand may be created. As long as the citizens are satisfied with slipshod management of health departments, and as long as health officials are appointed for political reasons, there will be no incentive for seeking such a training. The demand must be made by the citizens generally, not by some special class who may be suspected of self-interest at the expense of the community.

To understand fully the present conditions it is necessary first to trace the development of this particular line of service, to see what changes have already taken place, and to appreciate how and where improvements may be made.

CHAPTER II

THE DEVELOPMENT OF PUBLIC HEALTH IN THE UNITED STATES

THOUGH the protection of the general health of the community had long been a recognized work of government, the formation of distinct departments, charged especially with this duty, has been a matter of very recent origin. Among ancient peoples we find general sanitary laws and regulations. The infectiousness of certain diseases was sufficiently recognized so that their restriction by means of quarantine was a common practise throughout the civilized world. It is true that up to the time of the introduction of yellow fever into Spain, quarantine was only used against the plague, leprosy, and, at one time in Europe, syphilis. As matters of common justice citizens were made to realize that they must not work injury to their neighbors, and gradually there were evolved certain ideas and customs for the preservation of public health.

The United States derived most of its customs and legal practises from England. We find that in early customs of England the most efficient means of protection were found through judicial proceedings, and without special statutory enactments. Two methods were especially used, civil suits for the collection of damages, and indictments for maintaining nuisances. Both were based upon the old doctrine, *"Sic utere tuo ut alienum non lædas"*; that is, a person should so make use of his own property that it will work no injury to another. The enforcement of these judicial determinations was left to the ordinary officers of the law. "It is on record that Shakespeare's father was fined in 1552 for violating the bye-laws of the Manor of Stratford-on-Avon by depositing refuse in the street, and again in 1558 for not keeping his gutters clean; and in 1512 a Mayor of Nottingham was presented at the leet court for sundry misdemeanors such as selling herrings that were unfit for food and for beginning a muck hill."[1]

[1] Bannington, *English Public Health Administration*, (1915) p. 2.

From early times there was no dearth of laws pertaining to the preservation of the public health in England, but there was no attempt to systematize administration. In 1848 the first distinctly Public Health Act was passed, establishing a central board of health; but ten years later this board was abolished. It is always a weakness of amateur sanitarians to multiply laws and appoint special officers to enforce them. Just as in the United States to-day, so then in England, there were far too many enactments, and too many special officers appointed, until "in all country districts there is one authority for every privy and another for every pig-stye; but with regard to the privy, one authority is expected to prevent it being a nuisance and the other to require it to be put to rights if it be a nuisance."[2]

The formation of the Local Government Board, and the Public Health Acts of 1872, 1874 and 1875 began the establishment of real system in the health administration. According to those acts, as subsequently amended, this

[2] Quoted by Bannington, p. 9.

administration is both central and local. The central body is known as the Local Government Board, consisting of the president, appointed by the Crown, and certain governmental officers, *ex officio*. As a board it is largely a fiction. It seldom or never meets, but it employs a staff of more or less specially qualified aids. It is, nevertheless, a highly efficient body, and exerts a strong influence in guiding local administration. It formulates plans and passes upon the acts of local boards. Under certain conditions it aids in the selection and support of local officers.

Counties, boroughs, parishes, urban and rural districts have local boards, varying in authority, and often conflicting. These boards employ local officers of health, inspectors of nuisances, general inspectors and visitors, bacteriologists, veterinarians and other officers. By the General Act it is required that officers of health shall be legally qualified, and for districts having a population of 50,000 or more the officer of health must have a special public health qualification before he is appointed.

It is required that practically all of these officers must have passed a standard examination in order to be qualified for appointment. The very great weakness of the English system, in spite of a great deal of simplification within the past score of years, is its cumbrous machinery, and the resulting conflicts in authority. Added to this is the tremendous amount of legislation which causes no small amount of uncertainty as to what the law may be in a given case. Some of these acts are general, and binding upon the entire country; some are adoptive, and may, or may not, be used locally; others are merely permissive.

A great deal of liberty is permitted in local methods, and this results in a lack of standardization which is admittedly objectionable.

Another weakness, as compared with health administration in Germany and in France, is found in the relative lack of executive power. More dependence is made upon the use of court trials, where questions are decided by those who have no technical training. The resulting delays retard efficiency. There is a

lack of definiteness of responsibility, and frequent recourse must be made to the board of non-experts.

Under the present laws the health authorities of England have very wide authority, including supervision of factories, and town planning, the maintenance of baths, and the care of public hospitals, but they are frequently aided, and sometimes hampered, by the activities of various voluntary associations. A great deal of attention is paid to the question of food, and public prosecutions are frequent. We find, also, that civil damage suits for impure foods, and the injury resulting, are not uncommon—such, for example, as the collection of damages from the owner of a dairy for sickness or death caused by bacterial contamination of the milk supplied.

It will be noticed, however, that practically all of the provisions for safeguarding the public health of England have originated since the separation of the American Colonies from the mother country. Previous to that parting of the ways the only common measures, on either

side of the Atlantic, were found in the quarantine of diseased persons, and the suppression of nuisances. While it may be true that there is a more efficient administration in the mother country than here, the English advantage is found in the fundamental differences in governmental system, and in the more general insistence upon the employment of specially qualified officers, under the skilled supervision of the Local Government Board.

In 1647 the Massachusetts Colony put into effect a quarantine order of the General Court, particularly to guard against the importation of sickness, probably yellow fever, from the Barbados. There is evidence that the Dutch Colony at New Amsterdam instituted a like measure about the same time. This, it will be noted, was simply an effort to prevent the introduction of disease from outside the colony. So, too, the first sanitary enactment of New York was the quarantine law of 1755, providing for the quarantine of ships coming from ports infected with smallpox, yellow fever, or "other contagious distemper." This act im-

posed a fine of £500 for violation of the provisions, and it further provided that the Governor was to appoint a surgeon or physician as inspector. From time to time the law was re-enacted, sometimes with slight modifications. In 1793, Philadelphia was visited by an alarming epidemic of yellow fever. More than 4,000 out of the 60,000 population died, and neighboring states became alarmed. It seemed to be clear that the New York law was sufficient authority for the stoppage of ships coming from Philadelphia, but it did not protect against the coming of persons by land.

There was great difference of opinion as to the nature of yellow fever. Some held that it was in fact contagious; others that it was a miasma produced by filthy surroundings. Therefore, in 1796, a new law was passed, providing for land quarantine, and for the first time in New York it was also provided by general statute for the suppression of nuisances. It is interesting here to note that the old contention as to the character of yellow fever lasted for more than a century after this

double-acting law was passed, and it was adherents of a modified miasmatic theory who sought the removal of Gorgas and his staff after they had begun their work at Panama.

In 1635 the records of the colony of Massachusetts Bay show: "Whereas particular townes have many things which concerne only themselves, and the ordering of their own affairs . . . it is therefore ordered, that the freemen of every towne, or the major part of them, shall have power to . . . make such orders as may concerne the well ordering of their own townes, not repugnant to the laws and orders here established by the Generall Court." In 1692, for the first time thereafter, the General Court intermeddled with local sanitation to the extent that it provided that certain officers of market towns were empowered to assign places for slaughter-houses, still houses, and places for the currying of leather and the rendering of tallow; and such trades were forbidden elsewhere than at the places assigned. In 1797 it was provided that a town might appoint a health committee of

from five to nine persons, or it might appoint a health officer. With slight modifications these general provisions have continued until within very recent times. In 1799 the mayor and aldermen of New York City were invested with temporary authority over certain kinds of nuisances, supposed to be instrumental in the spread of yellow fever. This authority was extended as to time and as to subject until within a few years it was made general.

The events of New York and Massachusetts were fairly illustrative of the methods in other parts of the country. It will be noticed that the legislation was primarily general, by the legislative body of the state or colony, but that the selection of officers and the enforcement of the laws were left to local authorities. In practical application more and more was left to the discretion of the localities. Power was granted to them to do certain things, but it was seldom that the towns or cities were obligated to take sanitary steps. Though, as we shall see later, after a time the pendulum swung toward centralization of administration, and

though under our system of government all local power must be granted by the state, the town and city governments practically did as they pleased.

At that time there was no semblance of sanitary science such as we know at present. No one knew how these diseases were spread, and in fact there was no means of telling with any degree of definiteness what the diseases were. Diagnosis was at best a matter of opinion. Glandular tuberculosis was called scrofula, and was commonly supposed to be related to syphilis. Laryngeal diphtheria was called croup, and the medical ideas relative to other ailments were no more certain or accurate. As with diagnosis, so also with treatment, and particularly with the means which should be used to prevent the spread of infections. Even within the writer's memory good physicians frequently carried infection from one case to another. One went from a case of erysipelas to three confinements, and each patient contracted the infection and died. Another carried the diphtheria germ to a surgical case, and

perhaps, as he was convinced later, he carried the infection of scarlet fever to his own child. The wife of a distinguished physician, one who was ahead of his time in medical ideas, went to the funeral of a scarlet-fever patient, and rode in the carriage with the casket, and when she reached her home she took her little daughter on her knees and fondled her. A few days later my playmate was laid to rest.

With ideas so variant and uncertain it seemed better to trust to the judgment of several, rather than of one, in the hope that in the multitude of counsel there might be safety. In times of special danger these boards were accorded almost unlimited power by the common consent of the citizens. Not that they exerted this power lawfully, but that the legality of their action was either not questioned, or, if questioned, it was upheld by the courts as emergent necessity. It was thought that men educated in medical lore knew more than others about the laws of health. They were therefore leaders in sanitary endeavors. Boards of health were by no means always composed en-

tirely of physicians. In fact it was generally thought better to have a majority of the board composed of "practical" men who knew nothing of either medicine or sanitation, and sometimes there was no physician in any way connected with the work of the board. Boards were given authority to make rules and regulations, and under the guise of inspections the officers of health departments were enabled sometimes to enforce arbitrary and illegal, as well as injudicious, orders.

It was thus that city boards of health, or health departments, became the prey of politicians of the lower class. During the Tweed régime in New York City the health department became an efficient agency for the collection of blackmail, and there is strong evidence that such a practise has occasionally occurred even in recent years. Boards of health were therefore largely a law unto themselves. Because of the indefiniteness of the science there was no efficient means for judging as to the reasonableness of many of their laws, nor of the effectiveness of the measures proposed.

Epidemics, especially those of cholera, yellow fever and smallpox, always resulted in renewed efforts at the guarding of the public health. Judge Dillon says in his *Municipal Corporations* that the police power as related to health is one of the principal reasons for municipal organization, and it has been stated that the organization of the town of Chicago was accomplished on account of the desire of the citizens to have a local government which might be able to cope with the cholera, following the epidemic of 1832. That year the cholera act of New York gave to the governor authority "to employ suitable agents to proceed to any part of this state, or to Upper or Lower Canada, for the purpose of procuring information in relation to the progress of the said disease, and the prevention or treatment thereof, or for any other purpose he may deem conducive to the public health." Apparently this is the first instance of concerted governmental action in this country having for its object the investigation of the cause of disease.

In May of 1849, under the stimulus of the appearance of cholera, by a joint resolution of the houses of the legislature, the governor of Massachusetts was empowered to appoint a commission of three to report upon a sanitary survey of the state, with facts and suggestions. In the report which this commission returned it was recommended that a state board of health be established. It was not until 1869 that Massachusetts finally established the first state board of health in America; and this became the model after which others were later formed. It consisted of seven members, one being appointed by the governor each year. Members served without pay, and were ineligible for reappointment. The board elected a secretary, who was the executive officer of the organization. He was paid for his services. The duties of the board were: to take cognizance of the interests of life and health among the citizens; to make sanitary investigations and inquiries as to the sanitary condition of the people, the causes of disease, especially epidemics, the sources of mortality, the

effects of localities, employments, conditions and circumstances upon public health; to gather such information in these matters as they deemed proper for diffusion; to advise the government as to the location of public institutions; to examine and report on the effect of intoxicating liquors as a beverage on the industry, prosperity, happiness, health and lives of citizens; and to make an annual report to the legislature embodying the results of these investigations, with suggestions for further legislation.

It will be noticed that the board had practically no authority. Its duty was to investigate and advise. Still, a mere list of its duties shows that if the members fully complied with the requirements it would take their entire time. Why then should the state expect to receive seven years' service at special work, requiring a special kind of training, and expressly prohibit that its officer should receive any compensation therefor? Yet, this plan has been followed in a number of states. It is a general commercial rule that one gets on

an average about what he pays for. It is partially because of the provision against compensation for board members that no greater advance has been made in health administration. Another result has been that sometimes the members have at least been suspected of capitalizing their positions.

Apparently, it was only because of the presence of local boards of health that the idea became prevalent that health offices should be managed by boards. Local boards, however, had real authority, as state boards had not. The former dealt directly with epidemics and local conditions. The newly created state agency in Massachusetts had no authority. It simply acted in a clerical capacity to collect facts, and then presented those facts to the people, either directly or indirectly. The state board of New York, created in 1880, was composed of nine members, but in that organization there was an effort to coördinate other governmental activities. The attorney general, the superintendent of the state survey and the health officer of the port of New York

were *ex officio* members, and three were to be selected from the commissioners or boards of health of cities in the state. Soon this state board was given real authority, and supervision over local boards. By the law of 1885, it was empowered to compel the formation of local boards of health, and in case of local neglect the state board could make local appointments. Under such conditions there might be some excuse for making a state board of health.

The state board of health in Illinois was created in 1877. Like the board in Massachusetts it consists of seven members, who serve without pay. The secretary, whom the board elects, receives pay as secretary and executive, even when a member of the board. It has devoted its chief attention to the enforcement of the medical practise acts. Because the board must examine applicants for license to practise medicine it seems very proper that this duty should be divided between several, rather than that the candidate should be forced to depend upon the judgment of one examiner. Still it does not appear how the interests of the

state are conserved by depending upon gratuitous service. This board, from the time of its creation until January, 1915, has contributed practically nothing to our knowledge of infectious diseases, and its sanitary supervision has been uncertain. For many years past, until the appointment of its present executive, it has had no member with special training in sanitation. It was composed chiefly or entirely of physicians. The result of such an organization may be seen from its manner of handling rabies, or hydrophobia. This is an infectious disease, contracted by human beings from the bite of rabid animals, usually dogs. This disease causes annually a great loss of cattle, sheep, horses and hogs in the United States. According to the 1909 Mortality Report of the United States Census Bureau, the average number of human deaths in the "registration area" of the United States for the ten years preceding was fifty-four. (Because many states have such imperfect laws for the registration of births and deaths, or because of inefficient enforcement of the existing laws,

the records of such states are not accepted by the Census Bureau. The area from which reports are accepted is called the "registration area.") Those fifty-four deaths are unnecessary, and therefore inexcusable. Deaths may be prevented by using the special treatment originated by Pasteur, which consists in the injection of increasing doses, or doses of increasing strength, of the virus of the disease. The Illinois board very properly sought, and obtained from the state, appropriations for providing this treatment for those who were unable to pay for it themselves. The board then made a contract for the treatment of these cases at a certain institution in Chicago, where they have been well cared for. There is no criticism which should be made against the board for all of this. The members should be commended.

The Illinois board is composed of physicians, and they look at problems from physicians' points of view. The board, having made arrangements for the treatment of poor victims of the rabies, made no other efforts to-

ward control of the disease. Nothing was done to stop the spread of the malady. The members did not seem to realize the necessity. Prevention, not cure of disease, is the true work of the sanitarian. Rabies has been completely exterminated from England, from Holland, from Prussia and from other countries. All that is necessary to do is rigidly to enforce the muzzling of all dogs for a period of a year, and then to prevent the entrance of other dogs until they have passed through a period of quarantine. Because of the difficulty of rigid enforcement of muzzling over a large territory it might be necessary to extend the time somewhat.

It is probably true that the state board of health had no authority for ordering dogs in Illinois muzzled, but it might have collected and published the data relating to the disease in the state, and it might have urged the legislature to take action upon the matter, and have so published the facts that the citizens throughout the state would have assisted to stamp out the disease. The successful treatment of ma-

laria or of diphtheria patients tends to restrict the spread of the disease, for in each case the disease is propagated from other human cases. This is not true with reference to rabies. Practically that is spread only by dogs, and the muzzling of dogs has been the only thing found necessary for the eradication of the poison from a community. While the treatment and cure of a case is the aim and object of a physician, the sanitarian does not consider treatment of a case as a portion of his duty unless that treatment tends to restrict the spread of the malady. He therefore leaves the treatment to the physician, in order to devote his attention to prevention of disease.

The necessity for treatment of a case of disease is simply an open acknowledgment that the sanitarian has failed in his special duty.

The Michigan state board of health was formed shortly before that of Illinois. Under the guidance of Doctor Baker it sought to secure evidence of the causation of disease, especially the relationship of certain diseases to atmospheric conditions. Also, by means of

sanitary conventions held in the various cities of the state, the board spread knowledge and interest in sanitary subjects. It was Doctor Vaughn of that board who discovered that the poison of cheese, ice-cream and milk, which sometimes caused severe illness and death within a few hours, was due to bacterial infection, not to some mineral poison which had been introduced, either intentionally or accidentally, as had formerly been supposed.

The Massachusetts board has done service to the science of prevention by investigating the pollution of streams in the state. In Illinois this service is performed by a special commission, really working through the state university, though nominally in conjunction with the state board of health. The state board of Louisiana has always been active in administrative measures, and it has been given more legislative power than most states would permit. In addition, this board has equipped a health exhibit in a railway car, or cars, and in that way has been enabled to bring home to the people of the state the principal facts of the

modern science of sanitation. While the people are being guided through the car by one of the assistants who explains the various things shown, other assistants make a sanitary survey of the town. Then lectures are given, free of charge.

Gradually the various state boards have been growing in importance. Many have been and are doing excellent work. They have been collecting data, aiding in sanitary education, and making rules for the guidance of the subordinate organizations. The Kentucky board has been very active in all these fields, and its rural clinics on the hookworm and trachoma have been especially noticeable in the good accomplished.

There is a legal difference between laws and rules. According to the American system of government it is not generally permissible that there should be a union of any two of the three divisions of governmental power: executive, legislative and judicial. The work of a health department is essentially executive and administrative. The laws by which it works should

be enacted by the legislature. Recognizing this fact, and that executive organization for efficiency demands that responsibility be definitely fixed, Pennsylvania first abandoned the board idea and organized its state health department with a commissioner at the head. The state is divided into districts, and the various phases of administration are guided and watched from Harrisburg. New York has also appointed a commissioner, and is reorganizing its public health methods.

In the operation of boards of health very much depends upon the character of the executive. Such men as Hurty of the Indiana board, or Fulton of Maryland, or Bracken of Minnesota, accomplish much. Others have made a "big noise" and accomplished very little. Sometimes a board, animated with great enthusiasm, but guided by little realization of its authority or knowledge of the science, attempts to do things beyond its power, and of most questionable advisability; as when the Kansas board attempted to compel all consumptives to be segregated on trains

passing through the state. An antiquated and perhaps illegal method has long been in effect in Alabama. According to the statute the county medical society of each county is the board of health, and the state medical society is the state board of health. If the system has been at all efficient it is because of the faithfulness of Doctor Saunders, who has long been the state health officer.

Although the states have been slow to drop the board for the commissioner, cities have done so very generally. At first the local administration was confined to maintaining quarantine, attending to fumigation after the disease was over, and occasionally investigating a complaint of nuisance. Now the quarantine is materially modified, though it is used for many diseases not previously considered quarantinable. Many of our leading sanitarians have abandoned terminal fumigation as worse than useless. On the other hand, the departments are to-day watching a class of persons who formerly did great harm without being suspected, namely those who, without

themselves being ill, constantly develop and discharge certain disease germs. These carriers could not have been identified in the olden time. Then, too, the departments to-day must keep a watchful eye upon the production, care and sale of many articles of food which formerly were left to private supervision. The department laboratory must make examinations of specimens to determine diagnosis, and must make frequent tests of water and of food sold in the neighborhood. It must watch the construction and maintenance of buildings, especially tenements and workshops. On its own initiative, rather than on complaint of some citizen, the officers must be constantly looking for public nuisances and abating them.

While, therefore, the local department of health has lost some of its independence and authority, and while the state administration has greatly increased in importance, the local office has really become far more important than it was formerly; and if headed by a thoroughly competent man there is no department of city government which is of greater vital interest to the citizens.

CHAPTER III

NATIONAL HEALTH AGENCIES

WHEN the states adopted the present Constitution by which the United States was created in form, it was but one of the many steps by which the nation has been developed. The movement was one which was instigated for commercial reasons. There was no freedom of trade between the different states which had united in a loose federation. There was no security for the payment of money due from the confederation, and in many ways it was felt that a closer bond should be created. Since the prime motive was a unified commercial control, one of the provisions of the new document was that the Congress should have control over interstate and foreign commerce. However, many of the citizens were so suspicious that almost immediately certain amendments were accepted by the different states, and when some

of the states confirmed their share in the Constitution, it was only on condition that these would be adopted.

The Ninth Amendment to the Federal Constitution reads: "The enumeration in the Constitution of certain rights, shall not be construed to deny or disparage others retained by the people." The Tenth Amendment says: "The powers not delegated to the United States by the Constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people." Since that authority known technically as "police power" is not mentioned in the Constitution, it has generally been held that this power has been reserved to the individual states; and it is under this power that practically all governmental efforts at disease restriction naturally operate. The consequence has been that until very recent times the national government has taken few steps for the protection of its citizens from morbific ills.

Two widely different contentions have arisen from this state of affairs. Some, jeal-

ous for the rights of the individual states, have affirmed that under no conditions has the national government a legal authority in disease resistance. Others, generally ignorant of the principles of American law, have impatiently demanded that the Congress act in many ways, and that national administrative offices exert more power and authority. In the early years the first party were by far the stronger, but the necessities of the progress have brought about some changes in ideals.

No enactment, no formal agreement, no change of residence or of cession of territory can make a nation. A nation is the result of natural development. Its citizenship is homogeneous, in that they have uniform ideals and objects. Poland was divided between Germany, Austria and Russia, but Poland the nation continued to exist, though it had lost its independent government. Germany forcibly changed the language and many of the customs of the people, but they remained Poles just the same, and were not Germans.

The Articles of Confederation signed by the

representatives of the colonies did not make a nation. Neither did the Constitution. The interests of the different sections of the country were often divergent and antagonistic. One of the results of this condition was the war of 1861. Slavery was abolished, and this took away one of the bones of contention. Then came the development of transportation, especially by railroads, and the people of California were thus brought more close to the citizens of New York than the residents of Richmond had been to those of Rhode Island. As far as the population is concerned, the United States is now a real nation.

Poland is no longer a nation among the powers of Europe because she has no government of her own. A nation must have, to be perfect in ideal, a government with supreme authority over all its parts. There is now one very great flaw in the title of the United States as a nation. It is contained in those two amendments to the Constitution. In proportion as they may mean anything at all, they restrict the authority of the national govern-

ment. The states are prohibited from making treaties with outside powers, or between the different states. That authority is granted in the Constitution to the President, with the approval of the Senate; but the national government has not yet found authority to enforce the terms of such treaties upon individual states. Acting under police power the individual states enact conflicting laws, and the national government has found no way in which to prevent the condition. As a result, a man may have several wives in different states, with their respective families; yet in no state would two families have a legal claim upon him or his property. A physician going from one state to another has no security that he will be permitted to practise his profession in the new home. In proportion, therefore, as the amendments cited have effect, in that proportion the United States is still in its embryological stage as a nation.

Sir John Macdonald was a shrewd observer. Before the inherent weakness of our Constitution was generally appreciated in this country

he called attention thereto. In remarks made at Quebec, October 11, 1864, during the Confederation Conference which was discussing the proposed Constitution for Canada he said: "The primary error at the formation of their Constitution was that each state reserved to itself all sovereign rights, save the small portion delegated. We must reverse this process by strengthening the general government and conferring on provincial bodies only such powers as may be required for local purposes. All sectional prejudices and interests can be legislated for by local legislatures. Thus we shall have a strong and lasting government under which we can work out constitutional liberty as opposed to democracy, and be able to protect the minority by having a powerful central government." This comment was not unfriendly, for in the same city on the sixth of July, 1865, in speaking of our Constitution, he said: "I think and believe that it is one of the most skillful works which human intelligence ever created; it is one of the most perfect organizations that ever governed a free people. . . .

We can now take advantage of the experience of the last seventy-eight years, during which that Constitution has existed, and I am strongly of the belief that we have, in a great measure, avoided . . . the defects which time and events have shown to exist in the American Constitution." We, too, have had the privilege of observing the operation of the reversed system in our sister nation during the last fifty years. Is it not time that we, also, strike off the chain of those two amendments which prevents the United States from being a real nation, with full sovereign power?

It is possible, however, that the national government has far more power than has been supposed, especially for the protection of the public health. Because of the backwardness of many states in the matter of efficient regulation of the recording of births and deaths, the writer some time ago suggested that this duty be assumed by the national government. Good constitutional lawyers stoutly affirmed that this was impossible on account of those hampering amendments. However, encouraged by in-

terest shown in Cabinet offices, where it was said that entirely new questions had been raised in the outline submitted, the studies were continued. As far as the writer is aware the argument, as published in the *Illinois Law Review* for January, 1915, and in his *Legal Principles of Public Health Administration,* has convinced all of the objectors that the United States has that power. If it has this, perhaps it has other powers, heretofore supposed lacking. When Professor Harrington, the executive of the Massachusetts board of health, invoked the aid of the national government to stop the shipment of disease-producing milk from New Hampshire and Vermont in 1907 he was informed that the national government had no authority for such action. The same reply was made relative to the stoppage of the shipment of milk from Wisconsin to Illinois, but under the commerce clause of the Constitution authority was found for the passage of the national Pure Food and Drugs Act. Under this act hundreds of prosecutions have been made successfully for the interstate shipment

of milk or milk products which are not up to the standard set by the government. By this means the Department of Agriculture has been enabled to exert a strong influence for the production of safe milk.

At the present time there are several agencies of the national government which have to do with public health protection. These are: the medical branches of the army and the navy; the Public Health Service of the Treasury Department; the Bureaus of Chemistry and Animal Industry of the Department of Agriculture; the Bureau of Census, of the Department of Commerce; the Children's Bureau, of the Department of Labor, the Bureau of Education, and the Post-Office Department.

In the past the influence of the medical staff of the navy has been practically nothing. It has not added specially to our knowledge of the laws of sanitation, nor has it exerted administrative measures outside of its own immediate scope.

In marked contradistinction, the influence and contribution of the medical staff of the

army has been tremendous. Under military authority this service undertook making Cuba livable. General Wood, trained and educated as a physician, retained his interest in medical affairs after he entered the line. As governor of Cuba after the Spanish War he used his influence and authority to back the efforts of Major Gorgas. It was at that time that Surgeon General Sternberg appointed a board of army surgeons, consisting of Major Reed, Carroll, Lazear and Agramonte, to investigate and report upon the cause of yellow fever. Major Ross of the British army had just demonstrated the connection between the anopheline mosquitoes and malaria. The American army board demonstrated that yellow fever is only communicated through the bite of the stegomyia mosquito; that a yellow-fever patient can only communicate the disease to the mosquito during the first three days of illness; that there must be a period of incubation lasting some twelve days, and thereafter for an indefinite period, at least a couple of months, the mosquito is able to infect other human be-

ings. Major Gorgas, good-naturedly though skeptically, began to put the ideas to an immediate test, and completely demonstrated the practical utility of the discoveries. Then, at Panama, Colonel Gorgas again demonstrated the practicability of eradicating yellow fever and malaria from the tropics. As he has remarked, the great value of the work at Panama was not the mere performance of the engineering feat, but it was the demonstration that the white man can live in the tropics and remain healthy; and since the tropics are so much more productive of food, automatically the earning capacity of the white man has been doubled.

The glorious labors of this army board are not, however, matters for unmixed national pride. By making the fruits of the tropics cheaper of production and sale, they have benefited every inhabitant of this land; but as a nation we have been willing to take the profits without rendering to the men of science that compensation to which they were morally entitled. Carroll was the first person willingly

to submit himself as a victim upon the altar of science, to test the truth of the suspicions. He contracted the disease, was very ill, and in consequence developed a heart lesion which made him a chronic invalid, finally causing his untimely death. After his return to Washington he attempted to support himself and his little family by making microscopic examinations for other physicians, but so little money came in that he was obliged to pawn his microscope to buy bread. He died, and left his home mortgaged, and his family with no other support than the small pension. It was brother physicians, who in nowise profited from Carroll's labors, other than as all citizens were benefited, who paid the debt upon the home and provided for the education of the children. Lazear contracted the fever and died immediately. Reed came home an invalid and soon joined the silent majority. Up to the present time the United States government has done practically nothing to demonstrate its obligation to these martyrs of science.

For a long time before the American oc-

cupation the inhabitants of Porto Rico had been troubled with tropical anemia, which was supposed to be due to the air of the island. It was United States army surgeons who discovered that this anemia was due to the presence of a small intestinal parasite called familiarly the "hookworm." It was found that the pathologic condition readily responded to treatment, and a great change was made in the condition of the population. Incited by these results, investigations were made in our southern states, especially by Stiles of the Marine Hospital, and the campaign thus inaugurated has raised the condition of southern peoples beyond computation. Though the campaign against the hookworm in the United States was practically originated by the results in Porto Rico, the army had no other relationship to the work. Almost all of the sanitary campaign in the Philippines, however, has been waged by officers of the medical staff of the army, though not always under direct army control.

The wonderful results in Cuba and Panama

have sometimes been pointed to as evidence of what may be accomplished under a republican form of government. In his *South America,* Sir James Bryce calls attention to the fact that these results were *not* obtained under a republican rule. They were attained in spite of the fact that the United States is a republican government, and they were possible only by the abrogation of civil rule, and the establishment of strict military government.

In 1798, Congress provided for the establishment of the Marine Hospital Service. Its object was the care of sick and disabled seamen in hospitals which were established. From time to time the duties of the service have been increased. In the late seventies a national board was established, but it soon died on account of lack of support. When it died its duties also devolved upon the Marine Hospital Service, and finally the name "Marine Hospital" was dropped, and it is now known as the "Public Health Service."

The present Public Health Service is a most important organization. In addition to its

original duty of caring for sick and disabled seamen, and incidentally making examinations of candidates for positions in the revenue service and other branches of the activities of the Treasury Department, and attending to other matters of minor importance, this service has charge of the physical inspection of all immigrants coming to our shores. It is this service which superintends all foreign and interstate quarantine, and insular quarantine as well. Incidentally to this work the service collects the data relative to infectious diseases in all parts of the globe, publishing them each week. Its personnel is to-day probably the best qualified body of practical sanitarians on the earth.

The great work which the Public Health Service is doing is in the line of original investigations as to the nature and cause of disease. Surgeon Carter of this service had worked out some of the preliminary problems of yellow fever before the appointment of the Reed board of the army. Stiles has added much to our knowledge, and greatly assisted in working out the problems relating to in-

testinal parasites in America. Lavinder has been one of our best authorities on the pellagra. McClintick gave his life as a result of his study of the Rocky Mountain fever. McLaughlin has done valuable work in connection with the study of the pollution of our lakes and streams, especially those between the United States and Canada. Rosenau and Anderson, as directors of the laboratory, have made many valuable contributions to the science. They studied the standardization of diphtheria antitoxin, the causes of sudden death following the use of the antitoxin, the life history of many germs and the means for their eradication. Many others in the service have done equally valuable, though less conspicuous work of investigation.

The Rocky Mountain fever is spread by a species of insect known as a tick. One of the surgeons of the Public Health Service found that one means of eradicating the fever was by putting sheep to graze in the infected area. The ticks climb from the ground to feed upon animals. Having grown fat they breed and fall off to lay their eggs. When, however, the

animal upon which they have fed has long curly wool, like that of the sheep, the tick gets so tangled in the hair that it can not breed, and dies without propagating. The grazing sheep therefore act as traps for the extermination of the ticks.

Night soil has been frequently used for fertilization of truck gardens. The possible danger of such use was investigated by this service, and it was found that lettuce so grown sometimes showed the presence of colon bacilli upon its leaves. Experiments were tried with fly-blown articles of food, and it was found that the resultant flies could and did work their way to the surface of the ground when the food had been buried at a depth of seventy-two inches.

When the yellow fever last infested New Orleans, Surgeon White was in charge of the Marine Hospital at that point. The local commercial organizations at first denied the presence of the disease, and threw stumbling blocks in the way of the local administrators. When they realized that the conflagration had got beyond their control, White was asked

to take charge. He did so, working not under the authority of the United States, but under the authority of the state of Louisiana, and sometimes without any authority other than the necessities of the case. He performed many acts of arbitrary nature, but he exterminated the infection and saved greater loss for the citizens.

It was Kinyoun of this service who discovered the presence of the bubonic plague in San Francisco, and urged energetic measures for its extermination. The Chamber of Commerce made protest at Washington, and orders were issued for his transfer to a distant point. He resigned, and remained to keep up his fight. The disease gained ground, and surgeons were sent from other parts of the country to make an investigation. Again, local commercial interests were so unwise as to cause the suppression of the report for a year. Finally, when the truth could no longer be kept secret, it was Surgeon Blue and his assistants who were put in charge of the work of elimination. In the meantime, the disease had

extended beyond the city limits. Ground squirrels and other animals had become infected, and the work of extermination had become Herculean. From San Francisco the disease got up into the state of Washington, and down into Mexico. It appeared along the coast of the Caribbean Sea, and showed itself in Cuba, in Porto Rico, and in New Orleans. A large portion of the state of California was infected, and the reports just received show that an infected ground squirrel was killed in Contra Costa County, California, November 12, 1915, and an infected rat in New Orleans on February 4, 1916, where another case of human plague was reported September 8, 1915. The fire is smoldering, and the only real service looking after the matter is the Public Health Service of the Treasury Department.

This infection, which has cost the country many millions of dollars already, and which is still taking the time and attention of a large force of field workers, might easily have been controlled at first by prompt and intelligent

work. Misguided commercial interests, not being used to the disease, objected to the unusual methods proposed for eradication. They have paid heavily for their ignorance, but unfortunately at the same time the entire nation has also been punished. The San Francisco merchants denied the existence of the plague, and protested against the cost and inconvenience of the measures which were advised for the extermination. Their denial did not alter the facts. In the same way, certain people deny the existence of disease, as a mere error of the mind, but their denial does not at all comport with the daily facts of observation. Misguided reformers protest at vaccination, but the cold facts disprove their assertions. Some men who have licenses to practise medicine attempt to deny the proven facts of science; perhaps because they have let the moss grow in their brains, and have not kept abreast of the times; or, perhaps, because they were always professionally ignorant, and simply posed as physicians; and sometimes we must believe that they deny the facts of science as a

money-making scheme, well knowing that their own methods are pure confidence games. It is such misleaders as these who manufacture false statistics, as one of them did relative to the results of vaccination in Japan some time ago. It is such as these who give, for money received, any medical testimony desired by the payer, and are loudest in their denunciation of efficient public health protection. Efficient sanitation hurts their private business.

In the Department of Agriculture there are many bureaus whose work relates either directly or indirectly to the health of the citizens, but two are of especial importance. The Bureau of Animal Industry has control over the transportation of animals from one state to another. It studies and restricts the spread of animal diseases, many of which are of importance to human beings. It investigates and aids by its publications the production and marketing of dairy products and poultry. It seeks to educate the farmers in the best methods for producing and caring for their animal products, and it exerts a direct authority to restrict

the shipment of harmful articles. This authority is most evident in the conduct of the meat industry. A firm which desires to slaughter animals for shipment in interstate or foreign trade must make application to this bureau, and must comply with the strict rules laid down. Every portion of the interstate meat industry is under this supervision. Upon the filing of a proper application an inspector and needed assistants are immediately appointed to take charge of the slaughter-house. Every animal must be inspected before and after slaughter. The killing is strictly supervised, and all diseased meat is condemned and disposed of under this federal supervision. If the slaughter-house neglects to obey instructions it immediately loses the right to ship its products. If, for example, the condemned carcass is held, and an attempt made to pass it into some other trade channel, the inspector immediately drenches it with kerosene, and withdraws all rights of shipment, and with his staff of assistants he leaves the place.

Every slaughter-house under federal super-

vision must be conducted with care such as even hospitals lacked in days within the memory of older practitioners. The "surgical cleanliness" demanded is found in every department, from the killing room to the final shipment of the dressed meat or the canned products. Microscopists examine suspicious materials, and all materials which are not safe are rendered harmless. About two per cent. of all animals examined are condemned and destroyed, and in addition parts of many others are likewise destroyed.

In marked contrast with the interstate meat industry is that which concerns the people of the individual states. Only about one-half of the animals slaughtered in the United States are killed under this federal supervision. Animals which are suspicious are diverted by their owners to local slaughter-houses. In 1907, it was estimated that approximately 5,000,000 cattle, 8,000,000 sheep, over 10,000,000 hogs, and 3,000,000 calves were slaughtered by butchers without federal supervision, and a large proportion without any supervision at

all. Added to these there were about 1,500,000 cattle, 1,000,000 sheep, and 16,500,000 hogs which were slaughtered by farmers. Probably at least five per cent. of these animals should have been condemned. The federal government is without authority in the matter of animals slaughtered for consumption in the state where the meat is consumed. Some states and cities have laws regulating slaughter-houses, but the object of such state statutes or municipal ordinances is frequently to prevent nuisance to the neighboring property. It is very rare that these establishments have sanitary supervision even approximating that of the national government. A large proportion of the slaughter-houses where cattle are killed for home consumption are absolutely without supervision. Many of them are positively filthy, and very few have any provision for laboratory examinations.

It will readily be seen that where the business is conducted in a cheap manner it can well afford to undersell the more reliable product. A saving of five per cent. of meat which should

be condemned, a saving in expense of operation, and a saving in cost of equipment, easily render it possible to make a better profit while selling meat at from eight to ten per cent. below the price which must be charged for the product of the industry which is supervised by the national officers. It therefore happens that there is frequently manifested a local opposition to a really efficient supervision of the interstate business. Citizens generally do not know the facts. Until such a time as the national government acquires the authority to supervise the entire industry, every state should have a supervision of its meat industry patterned after that of the national government.

The work of the Bureau of Chemistry is more generally recognized. Under the guidance of Doctor Wiley it attracted great publicity, which was educational. Its methods differ widely from those of the Bureau of Animal Industry. When the Bureau of Animal Industry establishes a quarantine for "foot and mouth" disease it is heralded in the public press; but few know of the millions of animals

which are dipped to prevent the Texas cattle fever, or realize the efficiency of supervision in the meat industry. This bureau seldom appeals to the courts. On the other hand, when the Bureau of Chemistry confiscates articles of merchandise found on the farm, on trains, or in commercial establishments, it must appeal to the courts for support. The writer believes that better results would be obtained at less expense to the people if the Bureau were given more power to determine questions of fact, with permission for appeal to the courts as to legal interpretation of the statute. Every month there are numerous condemnations; and in a large share of the cases the defendants simply plead guilty and accept their fines.

The Pure Food Act was passed under the commerce clause of the Constitution; as such it must be considered as purely a commercial proposition. In the plainest terms the provisions of the act are that goods which enter this country from abroad or which pass from one state to another in trade, must be just what they are supposed to be; and that they must

not contain certain poisons, unless the fact thereof be plainly stated on the label. When a pillar of the church in Washington was arrested for selling a habit-producing drug as a cure for headache, though in fact it was simply dope, and did not "cure" the headache, a vigorous protest was raised against the officiousness of Doctor Wiley. He continued his prosecutions against these enemies of the public health, and the patent-medicine combine finally secured a change in the administration of the bureau.

It is amazing to look through the records of this bureau and see the number of prosecutions which have been made successfully. They find wormy breakfast foods and raisins, decayed oysters, spoiled canned goods, milk so loaded with bacteria as to be useless for food, and other injurious articles of kitchen merchandise. They find that many goods are adulterated, or inferior articles are falsely labeled to be sold as the more valuable. They find many articles falsely labeled as to composition, or as to weight. Should the bureau let patent medi-

cines alone it would still find plenty to do, and it would meet with little opposition; but the bureau wishes to protect the citizens from those harpies who prey upon others' misfortunes. An illustration of their methods may be instructive and interesting.

A certain firm manufactured a "Consumption Cure." They had in their number a medical graduate from a state university. He was misfortunate, crippled and "needed the money." He made the microscopic examinations, and furnished what little scientific knowledge was used in the business. The other members of the concern furnished the capital, and transacted the business, including the conduct of correspondence. Their training had been received in a grocery store. The firm advertised widely, and offered to make microscopic examinations of sputum free of charge. A specimen was received, and after due time the sender was informed that a large number of tubercle bacilli were found; that his case seemed to be severe but not hopeless; that the "cure" sold at a dollar a bottle, but that the

firm would send six bottles for five dollars; and that the doctor would advise trying the remedy; that it would do no harm, and it would help if it did not cure; and that after the six bottles had been taken another examination of sputum would tell just how the case was progressing. The money was sent, the medicine received, and after a time another sample was sent. Very promptly the "doctor" reported that the examination showed very great improvement, and that another half dozen bottles would doubtless complete the cure. *The samples of "sputum" sent were not sputum, but the liquor from oysters.* The "cure" was absolutely useless for any purpose except to abstract money from unsophisticated victims, and it is now one of the things of the past.

As a result of the activities of the Bureau of Chemistry very many makers of patent medicines have been obliged either to change the formula of their articles, or to alter the label, or to discontinue the sale entirely.

Vital statistics are the bookkeeping of a health department. In the Census Bureau of

the Department of Commerce there are collected such statistics of births and deaths as seem to be reliable. Under the wise management of the former Chief of the Division of Vital Statistics, Doctor Cressy L. Wilbur, the publications of this bureau were valuable studies of the causes of deaths and death rates. Unfortunately, his successor has not kept his work up to the former high standard, probably because he has not yet become thoroughly at home in his new chair. It is one of the misfortunes of our system of government that competent men are made to step aside to give some one else a job.

The Post-Office Department is aiding in the work by refusing to permit its service to be used by those who attempt to defraud the people by the sale of useless or harmful drugs, or by unlawful practise of medicine.

The Children's Bureau of the Department of Labor is the last of the national agencies created to guard the public health. This service has little authority, and has accomplished little as yet. Its work must be very largely in

the line of investigation. The search for data, the collection of statistics, and the careful study of the facts discovered must take time. Miss Julia Lathrop, the head of the bureau, has urged the passage and enforcement of state laws compelling the immediate registration of all births, but it will probably be some years before anything radically new should originate from the studies. Early impressions may be misleading in such investigations, and when anything shall be done it should be done rightly.

Lastly, in the Bureau of Education there is an effort to collect especially all data bearing upon education. Certain diseases or infections have a retarding influence upon the progress of the scholar. The result is that the education of the pupil costs more. The arrangement of schoolhouses, and of the curriculum, not only have their influence upon the health and life of the child, but they have also much to do with the economy of school management. For this reason the Bureau of Education has from time to time published and distributed

information relative to such subjects. One, for example, is upon the hookworm; another on physical growth and school progress; others are the detailed results of school inspections by medical officers in this country and in Europe. These publications are helpful by their educational effect.

Mention might properly be made of the new Harrison law which tends, incidentally, to restrict the sale of certain narcotic drugs, by requiring the annual payment of a small license fee by all physicians, druggists and others dispensing or selling the articles named, and requiring special records of all sales or dispensing of the drugs. The license fee is collected by the regular collectors of internal revenue, and the working of the law so far has been a definite restriction. The required registration of persons lawfully selling or prescribing these narcotics enables state and local officers more effectively to restrict the vicious use of the articles.

It is the opinion of most sanitarians that several of these national bureaus should be com-

bined into one department, under the leadership of a member of the Cabinet who should be, not a physician, but a sanitarian of broad experience, and with constructive ability. Such a head to the department should be permanent in fact, though not by enactment. Such a department is far more important to the people of the land than two or three of the present departments, but its establishment is opposed by certain commercial cliques who have already found that their business has been hampered by the light of publicity. The opponents are especially the patent-medicine manufacturers and commercial "doctors" whose practise depends upon misleading the people. Their principal supporter in Congress has been a member of the Christian Science organization. One of the strong evidences for the need of such a department is found in the hampering influence of the Secretary of the Treasury when the Marine Hospital and Public Health Bureau were first attempting to cope with the bubonic plague in California. That hampering influence was then instigated by the com-

mercial influences of San Francisco. It seems strange, therefore, that the people of that state, who have suffered so severely from this misguided commercial influence, should permit their senator to continue his opposition to an honest and scientific administration of the work of preserving the public health. Such a change would not in any way increase the authority of the nation over the subjects treated, but it would permit the harmonizing of such various activities, and would assist in having questions determined by those who are trained and educated in that special kind of work. Each party in the last general election promised in its platform to work toward that end, but as yet the present administration has been false to its promise.

Since this movement has taken more definite form the Public Health Service has been making rapid development. It is the contention of the friends of that service that it should be made independent, and that the other agencies should be added to its force, without making other special changes, simply raising the sur-

geon-general of that service to the rank of a Cabinet officer. There are many arguments in favor of this arrangement, though some have thought that it would be better to make an appointment of the head from civil life.

The army has maintained a medical school for the training of its medical staff, and the Public Health Service has offered its facilities for the training of a limited number of sanitarians. It seems to some advisable that this educational aid should be open to a larger number, and that state and municipal officers of health should be expected to make frequent use of such facilities.

NOTE. In speaking of the relationship of the mosquito to the spread of yellow fever, mention should be made of the fact that to Doctor Carlos Finlay, of Havana, is the credit due for suggesting that the stegomyia mosquito was the infecting agent. As early as 1881 he published his suspicions. Though he was unwavering in his opinion, he was unable to prove the fact, and he found few supporters. The Reed board simply demonstrated the truth of Doctor Finlay's assertion.

CHAPTER IV

MEDICAL AND SANITARY EDUCATION COMPARED

It has long been the custom in the United States to think that any physician is competent to give sanitary advice, and to head a health department, but in point of fact there is not one practitioner of medicine in five hundred who knows the rudiments of modern sanitation. The education, training, habits of thought and objects of work of a good physician are very different from those of an ideal public health executive. There has been, among physicians who have been drawn into public health work, a jealous resistance to the appointment of any but physicians to the heads of such departments; but considering the general apathy of the medical profession, their lack of training in this line and unwillingness to alter their courses of instruction in harmony with recent advances in sanitary science,

this jealous resistance is changing to regretful concurrence. The best education in the past for health executives has been given in schools of engineering. There is less in common between the ordinary medical practitioner's work and that of the public health worker than there is between either and the practise of dentistry.

In the *Journal of the American Medical Association* for July 24, 1915, p. 321, there is an article by Professor Milton J. Rosenau, formerly Director of the Hygienic Laboratory of the Public Health Service, and now the head of the Public Health School of Harvard University. It begins with the following statements:

"It may be a surprise to the readers of the Journal to learn that hygiene is included as a major subject in the curriculum of only three medical schools in this country, namely, the University of Pennsylvania, the University of Michigan, and Harvard. The teaching of hygiene is becoming increasingly difficult, on account of the widening scope of the subject, including preventive medicine, sanitary en-

gineering, vital statistics, epidemiology, industrial hygiene, and public health activities generally. It has become necessary to establish special schools with graded courses to meet the demand of training men to become public health officers. It is slowly becoming recognized that the training received for the M. D. degree, even in our best medical schools, does not properly fit a man to enter public health work. Sanitation and hygiene has become a separate profession."

In looking through the curriculum of a leading medical school one finds that the course of four years of study comprises approximately 4,000 hours of work. In the first year 576 hours are devoted to anatomy, and 400 to chemistry and physiology. In the next year 128 hours are given to topographical anatomy, 144 to bacteriology, 56 to hygiene, 128 to physiology, 112 to diagnosis, and 192 to pathology. In the next year forty-eight hours are devoted to diseases of children; and sixteen hours are given to medical jurisprudence, but it is taught from the standpoint of the medical practitioner, and has no value for the public

health executive. The entire balance of the course is composed of surgery and various lines of studies in practise. The entire course in anatomy, as far as it applies to the work of a health officer, could be given in one hundred hours, especially considering the time devoted to topographical anatomy. We find then that out of the 4,000 hours of a medical course only 1,308 have special value for the public health worker. On the other hand, a great deal of the course is devoted to the technical training of the surgeon, a training which simply tends to attract attention away from the essential subjects for the sanitarian.

By way of contrast, the public health worker should have a training in zoölogy, which would be useless for the man practising medicine or surgery. This training should enable the sanitarian to be able to recognize the difference between the culex, stegomyia and anopheline mosquitoes, either in the egg, in the larval stage, or in the adult insect. He must know the habits of the different species. He must know the habits of different varieties of flies,

and where they breed. He must know the species of rats, and their habits. He must know the life history of various disease producing protozoa. He must have a working knowledge of sociology, and of the science of sanitary engineering. His laboratory training must devote much of its attention to subjects of no special interest to the medical practitioner. He must be able intelligently to study vital statistics, detecting possible errors in reports and the relationship between cause and accidental concurrence. He must have a general knowledge of veterinary medicine.

Epidemiology treats of the methods by which diseases are spread. This is a science, far more definite than the medical practitioner can imagine. In many instances it is reduced to mathematical exactness, of great importance to the sanitarian. For example, a yellow-fever patient can not infect a mosquito after the first three days of the disease. The infected mosquito is harmless for the first twelve days after he has bitten the first patient. On the other hand, the malarial patient may infect the mos-

quito at any time during the progress of the disease, and after about eight days that mosquito is prepared to infect other persons. After feeding upon the patient the stegomyia remains at the house, but the anopheles returns to its breeding place. These distinctions have little bearing upon the work of the medical practitioner. He is not called until the patient is sick, and he is paid only for guiding his patron back to health. If the sanitarian is successful, the medical practitioner has nothing to do.

Aside from his knowledge of the science of preventive medicine it is absolutely essential that the public health executive should have a thorough knowledge of the legal principles of administrative law. The changes in the science of prevention must make differences in the methods of administration. To make the work effective it is requisite that the official should not attempt to do anything which is unlawful, that he must do all that is required by law, and that he attempt only those things which he may carry through successfully. The

fact that certain practises have been permitted in the past is no sufficient reason for thinking that they will be permitted to continue, and the bases of legal decisions have already been changed. For example: A tannery in Texas was sued for the death of a neighbor from malaria. It was shown on trial that the patient died from malaria, and that the place was kept in a dirty condition, surrounded with flies, and a judgment was rendered against the tannery. On a rehearing before the Supreme Court the verdict was reversed, on the ground that it was not shown that there were any anopheline mosquitoes bred upon the premises, and it is only by those insects that the disease can be propagated.

The legal responsibility of cities and private corporations and individuals is being more fully recognized for the spread of infectious disease. For example, Mankato, Minnesota, was assessed damages for typhoid fever received through the city water supply, and milk companies have been punished for communicating disease in the milk sold. This liability

of the city increases the necessity for having a competent person to keep constant guard over the health of the city.

Science is universal, and the fact which is true in one country is also true in another. The result is that the man of science naturally feels that the governmental plan which is efficient in one land should also be effective in another. Unless he has had a training in comparative governments he is unprepared to meet the legal obstructions which bar his path. So, too, the scientific man has difficulty in comprehending the legal distinctions which are absolutely necessary for preserving the rights and liberty of citizens. For example, a health official was complaining about the result of his prosecutions for violations of ordinances. He said: "No matter how carefully we work up our cases, they are knocked out on little legal technicalities." He failed to realize that it was not sufficient for him to find poison in an article of food, but he must convince the court that without reasonable doubt that poison had been so mixed in the food by the person accused. In

fact, in the case then being considered he could not prove that the food was actually purchased in its then condition from the merchant accused. The prosecutions of this officer occupied his time and attention, but failed to bring results because he did not appreciate the legal principles involved. In the place of being effective for good they simply created prejudice against the department. The training in the law of public health is one of the most important portions of the public health official's education.

Not long ago some one in speaking of this subject said that a knowledge of the law of public health gives the health officer more power by showing him what power he already has, by pointing out accurately the legal limitations upon his present power, and by suggesting what additional powers can be obtained, and by what methods. It makes it possible for him to pursue vigorously a definite, aggressive policy, without fear of overstepping his legal authority. This certainty in his

work will bring more satisfactory results than he has ever known before.

This education is not even hinted at in any medical school in America, aside from some of those attempting to give special instruction in those branches for the degree of Doctor of Public Health.

Nor is it sufficient answer to say that the department has the services of an attorney at its disposal. Relatively few attorneys are posted upon adminstrative law, and it is absolutely necessary that a lawyer handling such cases be posted upon the scientific facts, and their bearing upon the case in hand. This is frequently illustrated in the experiences of every live department of health. The result is constant vexation and disappointment for the conscientious conservator of the public health. Important cases are lost, and ordinances declared unconstitutional, because the attorney has failed properly to grasp the significant features. For example: In a certain case the prosecution was being made under a city ordinance. If the contention of the subordinate

in the health department was correct it was simply a question as to the authority of the city to pass the ordinance, as admittedly the facts were as stated by the city officers making the inspection. However, not realizing the scientific basis for the ordinance, the attorney for the prosecution insisted on trying the case on the interpretation given by the inspector. For the same reason, and not realizing that it is necessary that there be a scientific reason for such an ordinance, the inspector had made an interpretation which could not stand in a high court. The result of such a trial is to have the ordinance declared unconstitutional, when in fact, under an interpretation in harmony with scientific facts, the ordinance was both reasonable and constitutional. The test was tiresome, occupying much time which might have been spent more profitably, and it was foredoomed to failure. It irritated the defendant, and made him feel that he was being persecuted. All this happened because there was no one person who was able to harmonize the facts of science and the principles of law. Every

case which is successfully prosecuted tends to strengthen health administration, but adverse decisions create distrust, prejudice and contempt of departmental efforts.

The treatment of sewage and the disposal of garbage are some of the great problems for the modern city. Neither is exclusively a problem for the engineer, though both may be handled chiefly in the engineering department of the city. There are certain points upon which the advice of the health official must, or should, be sought, and to give his advice intelligently it is needful that he know something of engineering. How many physicians know the difference between a garbage reduction plant and an incinerator? How many are prepared to advise between a mechanical and a slow sand filter for the public water supply? How many would be prepared to act promptly and efficiently should the public water supply become temporarily polluted with sewage?

Some time ago a number of families located a beautiful suburb, for their summer homes especially, within easy reach of an eastern city.

It was found to be a particularly healthful locality, and with modern sanitary appliances in the little city its future looked promising. Property rose in value and the population increased. Then some bright mind conceived the idea that an electric road connecting the suburb with the larger city would be a good investment and a help for the suburb. The line for the road ran across a piece of low land. Before the road was completed malaria made its appearance in the suburb. It increased in prevalence, and the suburb became known as a home of malarial fevers, and the boom of its real estate burst. When the harm had been done, and the town had been ruined beyond recovery, some sanitarian made an investigation. He found that the low ground was infested with anopheline mosquitoes, and that the laborers who constructed the road were old-country Greeks, who had not been long in America. Now it is well known that malaria is very prevalent in Greece, and it is very probable that these immigrants brought the malarial infection and gave it to the suburb through the

agency of the mosquitoes. The ordinary physician is not prepared to deal with such a problem. He treats his patients to get them well. He knows how to do that; and if other cases occur in the family he advises a change of location, and washes his hands of the perplexing matter. If, in addition to practising medicine, he happens to be the sanitary adviser of the community, he generally stoutly denies that the infection is local or common. He does not have the least idea how to begin the investigation as to its origin.

Under exactly the same circumstances, the wide-awake and trained public health official immediately isolates each case from mosquito attack, and begins a war of extermination, not against the culex, or the stegomyia mosquitoes, but against the anopheles, especially those which are likely to come in contact with previous cases. To do this, he must know where to cut grass and bushes, where to "train" streams, where to use oil, where to fumigate, and how to trace the insects which invade a given house. With such treatment of the case there should

have been no depreciation in the value of real estate, and the number of cases should have been very limited.

Another evidence as to the difference of view-point between the physician and the sanitarian is found in the following incident. The head of a certain metropolitan university was advised to require evidence of successful vaccination from all candidates for matriculation. He was surprised at the advice—surprised because if it were necessary he thought the medical advisers of the institution should have said so. He referred the matter to them, and they promptly said that it was not necessary, "because the law requires all children to be vaccinated before they enter the grade schools, and practically all students are vaccinated before they come to us." The medical advisers were the dean of the medical school and the professor of chemistry of the same school. The facts were that there was no vaccination law in that state, and returns from over the state showed that relatively a small proportion of grade-school pupils showed evidence of vaccination,

and that a goodly proportion of the students in that university were not vaccinated, and that within a short time one or two of those unvaccinated students contracted smallpox. If two of the leading members of the faculty of one of the foremost medical schools in the United States make such an error as this, what can be expected of an ordinary practitioner of medicine?

One may frequently hear, as an argument for not paying proper compensation for the work of a health officer, that it is a good advertisement for a young doctor, and that it will help him to establish a practise. No greater error could be made. There is a statement in the Good Book to the effect that no man "can serve two masters: for either he will hate the one, and love the other; or else he will hold to the one, and despise the other." Ye can not serve the public health and private medical practise. That has always been true, and now it is still more true than formerly. This fact should be clearly appreciated by every citizen.

First, the very time when it is most neces-

sary for the conservator of the public health to give the public the best of his service is also the time when the demands of a private practise are the most urgent. If he is paid for the private work at a higher rate than for his public service it must mean privation for himself and for his family if he takes the time from his patients to destroy the practise of his brother practitioners by preventing sickness.

Secondly, the line of thought of the doctor who is treating his patients is very different from that of the public health worker. One can not travel two roads at the same time.

Thirdly, every conscientious conservator of the public health arouses personal enmity. Other physicians are prone to think that they are being discriminated against, and their patients feel sure that the law is more severely executed against themselves than against the patients of the health officer. Then, too, his own patients feel that they should have certain privileges, and if these are not forthcoming the patients object. They object still more strenuously if they feel that the doctor neglects them

in their hour of need. If he be not engaged in private practise many will still feel that he is unduly severe with them. They forget that the law demands that certain things be done, and that the doctor is only a servant, sworn to execute the law as it stands.

No doctor engaged in private practise has probably ever served honestly and faithfully as a health official and not thereby injured, or ruined, his private practise. It is undoubtedly true that many doctors have increased their private business while holding such a public position. They may have done so honestly, in so far that they did not use their positions to divert patients from other physicians, though they neglected their public work whenever private business was urgent, and they used their leisure time in self-advertisement through their official positions. In other cases they have "used the livery of heaven to serve the devil in," making use of their positions to undermine their fellow practitioners, or for hunting victims for their operative or other practise. There are some in the medical pro-

fession, as there are in the pulpit, who are a disgrace to their professions. In neither case should the profession be judged by these black sheep. *To ask a medical practitioner to serve as a public officer of health and not pay him amply therefor, is to put a premium upon dishonesty.*

In this connection it is profitable to consider the words of the Greek physician, Hippocrates, who wrote four hundred years before the time of Christ: "Such persons are like the figures which are introduced in tragedies, for as they have the shape, and dress, and personal appearance of real actors, but are not truly actors, so also physicians are many in title, but very few in reality." This statement is true in the United States to-day as it was in ancient Greece, and it is very much more true of public officers of health.

For a city to ask a medical practitioner to be its health officer, and not give him ample pay therefor, is practically to attempt to comply with the letter of the law and evade its spirit; to appoint an officer, and make it an ob-

ject for him to neglect his duties. Generally under such circumstances the city pays the office all that the services rendered are worth.

In spite of the usual treatment of such positions in this country there is an honest body of workers who come nearer to the ideal of Christ than any other body of men on earth. In searching for the cause of disease, and means for its eradication, many have given their lives that others might live. There was the son of Sir Patrick Manson who submitted to the infection with malaria to prove the instrumentality of the anopheles mosquito, and later died of an accident while on an investigating expedition. There was Doctor J. Everett Dutton of the Liverpool School of Tropical Medicine, who died of relapsing fever while investigating the African sleeping sickness. There was Doctor Walter Myers of the same school who died of yellow fever at Para, Brazil, while studying that disease. In America there were Lazear, Carroll and Reed who died as the result of their investigations on the same disease. There was Doctor Howard Ricketts who suc-

cumbed to typhus just as he proved the instrumentality of the body louse as the carrier of that infection. There was McClintick who was offered up to the Rocky Mountain fever. There have been others, willing victims for the good of humanity.

Many physicians have willingly given of their time and energy to solve these problems of human life, taking it from their private practise, often suffering privations therefor. They have done so without compensation oftentimes. They have done it recognizing that their work, if successful, must diminish the possibility of earning so much in private practise. This conduct is incomprehensible by commercial minds. No other class of men on earth have deliberately set about the destruction of their very means of support, yet physicians have always been the leaders in efforts to eliminate disease. If a preacher conducts a revival and assists in the conversion of many souls he thereby increases the size of his church, and thus tends to increase the size of his salary. The inventor who works out some great im-

provement in machinery thereby increases his opportunity for accumulating property. But the physician who demonstrates how a disease is produced, and the means for its eradication, thereby destroys another source of self-support. It was physicians who called attention to the large amount of typhoid fever in Chicago, and the means to be used for its reduction. As a result, in 1915, it has been estimated that the physicians of the city made about 2,000,000 less calls on patients sick with that fever than they would have made at the old rate. The sense of benefiting their fellow men is their only reward. With the reduction of typhoid, and as a result of the same measures as used for that disease they also have lost the chance to make many more professional calls, and in consequence very many practitioners in that city have felt most keenly the pinch of poverty.

A physician who had made a careful study of a certain epidemic, and proved conclusively its cause, and had materially aided in checking its ravages, one day met one of his patrons.

The gentleman commended the doctor for his "grand work," and urged him to keep it up.

"I can not afford it," the doctor replied.

"Why not? You are saving lives, and are specially fitted for such investigations."

It was a case of milk infection, and the doctor had been threatened with damage suits for his exposure of the agency. He asked his patron: "Supposing I knew that you were taking that milk, what would you have expected me to do?"

"Tell me," was the reply.

"Yes, and what would you have done?"

"I should have changed my source of supply," said the patron.

"Yes, and supposing I had not told you?" asked the doctor.

"I suppose that my two children would have taken the fever."

"And you would have employed me?"

"Certainly."

"And you would have considered yourself lucky if my bill had not been more than twenty-five dollars?"

"Certainly."

"But you think I should have told you, and warned you?"

"Of course."

"And what compensation would you have expected to give me for the warning?"

"Why, I should have thanked you."

"The grocer is willing to accept the twenty-five dollars, but he does not accept thanks for his goods."

Here is a problem in morality. Should a doctor starve himself and his family for the pleasure of saving the sickness of the family who is able, but unwilling, to pay him for the greater service, but who cheerfully pays for the less noble work of treating the sick?

Or, put it in another way. Should a man be expected to devote many years of study, at a cost of thousands of dollars, and then enable the people of his city, or county, or state, or nation to make more money as a result of health preserved, when the community, either great or small, is unwilling to compensate him for his service? Does it show good business

sense for a community thus to seek a special service, and not pay at least as much as the officer could earn in some other way? Would any business man expect to conduct his private business on any such plan? If he refused to pay the foreman of his manufacturing plant which was making a good profit, would he not find that the foreman would either neglect the business, or else that he would collect his pay in some other way while he still retained his position. In ordinary business if a man is willing to hold a position with a nominal salary while his labor is yielding a good income for the proprietor, and he may easily obtain another position where he can make a good living, is not the fact of his remaining strong evidence that he expects to get his compensation in some other way?

So long as public health was not a special science requiring years of expensive study to fit him for the place, and one person could fill the position as well as another, there might have been some justification in the statement that the citizen owes something to the community;

but now that it is a special science which finds small opportunity for employment outside of official life, there is no justification in expecting such an officer to sacrifice himself and his family for the benefit of others, and that without adequate compensation.

The medical practitioner has little occasion for studying the mechanical and biological problems of the milk production and the dairy business, but a thorough acquaintance with that important line of food products is an essential for the health official. He must be able to tell at a glance whether conditions are fairly satisfactory. These questions are not bare technical theories; nor do they depend upon strict formulæ which may be printed and studied in the office. They are matters of training which require full time and attention. They involve the condition of the cattle, the character of food given, the nature of grazing land used, the disposal of manure, even where it may be left in the field, the nature and condition of other animal life around the place, the manner of milking, the method of cooling and bottling

the milk, the condition of the bottling and capping machines, the operation of the pasteurizer, the after care of the milk from the time it is put in the bottle until it is put in the stomach of the user. Of course, he must know the habits and health of all connected with the trade. In one instance a man was found capping bottles while his hands were still rough and scaling from a light attack of scarlet fever. In another the children of a household were coughing and sneezing with measles in a kitchen where the milk was strained. Milk from tubercular cows is frequently sold for children's consumption unless the officers prevent it.

There is another line of study which is important for the public health official. He must have at least a general knowledge of veterinary medicine. This is far more important than all that he could know of human surgery. Rabies is a disease which is communicated to human beings only from the lower animals, and not one physician in a thousand knows a rabid dog when he sees it. Tuberculosis is communicated from cattle to men, and especially to babies.

Anthrax is more common among the lower animals, but its toll of human life is not unknown. The tapeworms found in human beings are all derived from lower animals. Glanders, a disease of horses, probably kills more human beings than any one is aware of, the diagnosis in human beings being often incorrectly made. The Malta fever, which Sir A. E. Wright and others of the English army have so perfectly studied, is a disease contracted from goats. It is now prevalent in Texas, and may at any time make its appearance in some other locality. It must be remembered that goats are frequently kept especially for infant feeding. The bacillus of lockjaw is frequently found in horses, and it may be a common resident of the horse's intestine without showing its presence by toxic symptoms. "Lumpy-jaw," or actinimycosis is a common ailment among cattle, and human beings sometimes contract it from the cattle, either directly or indirectly. As with glanders, the disease is sufficiently rare among humans so that physicians have difficulty in correctly

making a diagnosis. The cow-pox is sufficiently rare in America so that it is relatively unimportant, especially as its occurrence in the human species is not severe, and is protective against smallpox. Ring-worm is transmitted from human beings to cattle, and back again, and may possibly explain other ailments found to be related to milk supply. Diphtheria may be carried by domestic animals, and other diseases may be shared between the human and lower animals.

In addition to the specific diseases which may thus be communicated from the animals, there are other ailments which may be the result of eating meat from diseased hogs particularly. The flesh of those suffering with hog cholera, though it may not look specially bad to the uninitiated, contains a poison which, when it is eaten, produces great prostration with diarrhea. Cooking will kill bacteria, so that if the meat has been thoroughly cooked there is no danger that a person will contract tuberculosis, for example, from eating the flesh

of a tuberculous cow; but cooking does not always kill the poison which may be the product of a bacterium.

In all these cases the prevention of future cases of illness may depend quite as much upon the recognition of the disease in the cow, horse, goat, sheep, dog, cat, pigeon, chicken, goose or duck, as upon the correct diagnosis of the human patient's ailment. The foot and mouth disease of cattle is essentially a disease of the lower animals, but it sometimes infects human beings, and it is still a question whether or not milk from the infected animals may not cause human infection, even though the utmost care be taken. However, the disease generally results in a rapid drying of the milk production.

The enumeration given by no means exhausts the list of subjects with which the health official must become at least generally familiar, even though it be no more necessary for him to know how to treat diseased animals than to treat human beings. There is no knowing where it may be necessary for him to direct his attention. He must be prepared to meet

every new situation and make the needed original study.

Rats are great travelers. They hide in freight cars and in the holds of ships. The rat and the flea have formed a partnership for the distribution of the bubonic plague. So far as known this disease has not yet come nearer to Chicago than New Orleans; but to-morrow it may be discovered that the disease is already in the first named city. It is manifestly impossible to kill every rat in the entire city immediately, but it would be necessary to begin the task at once, examining every animal for evidences of the malady. When an infected rat has been found the location where it was caught or killed must be taken as the center, and beginning at the outside of a given radius it will be necessary metaphorically to "rake the district with a fine-toothed comb" to make sure that every rat in that district has been killed. The location where each is found must be marked upon the tag by which it can be identified, and if another infected rodent appears its location must be considered as a new center

possibly. It is easy to blow out the light of a match. A bonfire may be more resistant. A conflagration in which fires are burning in many places over an entire city is exceedingly difficult to master.

Doctor Lilian South of the Kentucky state board office, in discussing the work of exterminating the hookworm, remarked in the presence of the writer, that one of the greatest obstacles with which they had met was the apathy of school teachers who have come from northern universities. They have not been taught the rudiments of hygiene in their alma maters, and they frequently come with the most erroneous notions. The result is that they are apathetic, or they are officiously active in the wrong direction. Not long ago the health commissioner of a large city announced a campaign against the fly. He called a number of physicians together, and asked them to give public lectures, especially before the school children. One of the professors in a medical school suggested that some of them, including himself, needed to study the subject before they would be able

to give such lectures. The commissioner, though prominent as a surgeon, and as a former head of a medical college, was utterly untrained as a sanitarian. He assured the gentlemen present that they were all quite well qualified to give such talks, and he handed around typewritten outlines of such lectures. Those outlines were filled with the spectacular features of the dangers of fly infection, and of bitter denunciations of the insects, *but they told nothing definite of the manner in which flies could, and should be exterminated.* He did not know, and while riding through that city on the public trams one might see hundreds of manure piles where the flies bred, and those piles remained day after day, and from one week to the next.

The fact is that the greatest aid a health executive may have in eliminating certain kinds of nuisances will be found in a proper use of the school children. But the children must be taught, and that means that the teachers must learn the facts in the normal schools and colleges. No teacher can get a certificate enti-

tling her to teach even in the grade schools of North Carolina until she has passed an examination in general sanitation; and yet our northern universities and normal schools do not give such courses!

There are two chief aims in a proper education. First, the student must be trained to think and to observe. Secondly, there are certain things which he should learn and know. There is no line of study which more fully complies with these two possibilities than does the matter of public health; yet when a committee attempted to enlist an interest in such courses in normal schools and colleges a few years ago they were met with almost universal objection. They were told that the schools had no money for such instruction, and that there was no demand on the part of the students for such instruction. No demand on the part of the students! When, pray, did the college professorial faculty condescend openly to be led by the student body? No money for such instruction? Of course not, for the colleges which should be leaders in advanced work for the benefit of

humanity are so wedded to the commercial object that they have not been able to look ahead and comprehend what may be the needs for the future, or their moral duty in the nation.

Those who are seeking to qualify themselves for some money-making profession are willing to pay for their instruction, but those who are simply seeking a general education can not afford to pay fully for instruction in a branch which will not be their bread winner. The form of instruction to which reference is here made is not that which would make public health specialists, though it might give to some a glimpse of a future of which they now can have no idea. What is here suggested for a course in normal schools and literary colleges is just the general facts of the present-day science—such facts as will enable the student to become a better citizen and make him an aid, not a hindrance, in the general work of sanitation. Such as will fit the grade-school teacher to guide her pupils toward a better existence. Such as will make people better, happier and more prosperous.

One would be considered lacking in mentality if he undertook to bail out a boat without stopping up the hole through which the water entered. Is the man any less foolish who endows hospitals for the care of the sick, rather than to endow the work of preventing sickness? Hospitals are needed, but were disease production checked, it would soon be found that we have more hospitals than are necessary. The graduated engineer has before him plenty of opportunity for obtaining self-supporting employment, and he can therefore well afford to pay for his training. Why then should chairs in engineering schools be endowed, if to furnish such professorships the teaching of public health must be neglected even to the point of forgetfulness?

Aside from positions at the head of health departments, there should be an opportunity for many to be employed in minor capacities. City and state departments of health have need for the employment of many inspectors and other workers. These employees should have a special training and education. At present

the best that can be done in most instances is to take those who give promise of efficiency and train them after they are appointed. Why may not every literary college give such instruction as will enable graduates to take such positions and do intelligent work from the first? Why may not special courses be designed and special degrees given with this in view? Just as soon as the people realize that economy and self-interest demands trained health workers at reasonable pay, then the day of the political grafter and incompetent officer will have passed. Until then good health service should not be expected.

CHAPTER V

CHANGED SOCIAL AND ECONOMIC CONDITIONS

In a previous chapter we said that formerly practically all the work of public health protection was performed by local officers. The measures used were the most primitive and simple. They consisted chiefly in isolating those sick with diseases recognized as communicable, holding them in quarantine until it was supposed that danger of infection had ceased, and then fumigating the premises or destroying bedding and clothing, generally by fire. In addition there was some attempt at abating things or conditions recognized as public nuisances. Only a few diseases were quarantinable. Diphtheria, scarlet fever, typhoid fever, malaria and other maladies which to-day are known to be transmissible from patient to patient, either directly or through the instrumentality of insects or other species of

animals, were formerly regarded as due to some uncertain condition, generally some peculiarity of the atmosphere, or of water. Smallpox, yellow fever and cholera were the only common diseases in America to be quarantined.

Changes in two widely dissimilar regards have materially altered the former practises. Scientific advances have brought a definiteness of procedure impossible before, and they have not only greatly enlarged the number of diseases which are properly within the authority of the health administrator, but they have also demonstrated that each disease must be handled in a manner peculiar to itself. Of this we shall speak in the following chapter. Here we must consider the results of the changes in the social and economic fabric of the nation.

In an isolated farming community there are few problems in public health administration. Families are isolated so that infectious diseases have less opportunity for spreading. It is true that diphtheria, for example, did formerly go through such communities, reaping rich harvests; but it was because the disease was not

suspected of being infectious. Not being so recognized, the sick were frequently visited by their ordinary companions, and were caressed and fondled. Funerals were widely attended. In one such community the following incident came under the writer's official notice. There had been many cases of "ulcerated sore throat," and several had died. Two cases came into the writer's jurisdiction and were recognized as diphtheria. When their bodies were taken home for burial there were other cases in the same family, and a nurse was engaged to assist in the care. The attending physician was also the local health official. One evening there was a public dance in a neighboring schoolhouse, and the physician took the nurse directly from the house of sickness to the dance. Up to that time he had not regarded the local sickness as "catching." It was before the days of bacterial diagnosis, so that a definite diagnosis was not so possible as at present. Immediately after that dance there was an outbreak of what the doctor recognized as diphtheria. It swept through the entire township, and there were

few houses which escaped its visitation, and the harvest gathered by the grim destroyer was far from small. When, under the instructions of the state board of health, the infectiousness of the disease was recognized, the natural isolation assisted in immediately checking further progress.

In a farming community, where every house has its own well or spring, the problem of pure water is not difficult of solution. It is true that many wells were so placed that they received infected drainage, but that was easy to alter if the people could be convinced. In one instance the writer asked about the water supply and was told that it came from a "spring." He examined, and found that a box had been lowered into the ground close to a ditch. Household waste, including discharges of the body, was thrown on the surface of the ground which sloped away toward the "spring," only a few yards distant. When the inspector said, "Here is where your disease comes from, and you must fill this hole and get your water from some other source," the housewife indignantly

replied that the water was clear and pure, and that "the disease came from heaven." The water was clear and cold, and probably did not taste offensive. The authority assumed by the officer was firmly enforced, and no further trouble arose.

The disposal of nightsoil and garbage is no great problem upon the farm. There is little danger of receiving an infection like diphtheria or typhoid through the milk of an isolated farm, though at one time it was suspected that scarlet fever was so produced, but such cases were attributed to an infection received by the cow because of drinking bad water, or as a result of illness of the cow.

When the country gives place to city conditions, some other disposal must be made of the garbage, the nightsoil and the household slops. Private wells must give place to a common water supply, derived from a distance, and from a source of known purity. Privies give place to water-closets, and ditches to sewers which conduct the waste to a distance. But sewers pollute streams, so that the sewage must

often be purified. At first it was simply run through settling tanks, where the gross impurities were permitted to sink to the bottom, and were then occasionally cleared out. Then came the septic tanks, where bacteria partially digested the organic material. However, it was found that the septic tanks frequently refused to work satisfactorily in the summer-time. The scum was broken up by escaping gas, and the odor which arose was very offensive. Doctor Karl Imhoff, of the Emscher sewerage district in Germany, invented an improved form of tank. This takes the crude sewage, and discharges water which is often clearer than that of the stream into which it flows, and with the number of harmful bacteria greatly reduced. A running stream has the power of diluting and purifying a certain amount of sewage, and in most small country cities this Emscher tank may be sufficient. However, after the effluent is discharged from the tank it may sometimes be necessary further to purify it, either by the use of chemicals, by filtration, or perhaps by exposing it to the purifying effect of air

by spraying it upon an exposed surface. Except in very isolated sections, or when discharging into a very rapid stream, falling over rocks or dams where the water is much exposed to the action of the air, it is doubtful if sewage should ever be permitted to run into a river without first having been passed through an Imhoff tank.

Upon the farm the household garbage may be fed to the chickens or pigs; but pigs can not be kept in town, and it is not safe to feed much to fowls. Garbage furnishes food for flies and rats, two pests which should not be tolerated in town. Manure upon the farm has a definite value, and the intelligent farmer may easily care for it so that it will not be a nuisance. In town the manure furnishes a fine breeding place for flies and rats. It must be kept in boxes or pits with water-tight bottoms, which must be swept out at least once a week during the fly-breeding time. It should be made proof against rats, and the surrounding ground be kept clean and dry. If the ground be permitted to receive the drainage from the manure

box, that too will prove a breeding place for flies. Stables in the country need not have tight floors, but in town there should be no place for rats to get under the floor, unless the floor be high enough for the easy access of dogs and cats, and the floor should be water tight so that manure seepage may not so pollute the ground as to furnish a possible breeding place for flies. The barn should be as nearly rat proof as possible.

Rats are expensive boarders, even in the country. The Incorporated Society for the Destruction of Vermin estimates the yearly losses from rats in Great Britain and Ireland at £15,000,000. Denmark estimates its rat bill at about $3,000,000 a year; Germany at 200,000,000 marks; France at about $38,500,000; and in the Public Health Bulletin upon the *Rat and Its Relation to Public Health* we find the estimate of the amount of property destroyed by rats in the United States at $35,000,000 per year. The cost of feeding a single rat with ordinary grain is from sixty cents to two dollars per annum. Around

restaurants and hotels the bill includes not only what they actually eat, but what is spoiled.

In addition rats are known to carry the plague, and they may also be responsible for other infections. There is good evidence that they may also spread diseases of other animals, such as the foot and mouth disease of cattle. They are unmitigated pests. It may be that they may reside for many years in a community without causing special danger of disease; but with the advent of a single case of plague or of the foot and mouth disease there is no safety until every rat shall be exterminated. It is far better to begin the warfare before the epidemic has been started.

In the older days when traveling was done by horse or wagon, or by boat of small size, when long journeys were not common, and took much time, the approach of disease from a distance was easily recognized. Food conveying infectious disease was rare. Rats had to travel by foot, or sometimes by boat. They were then no great danger from the health

standpoint. Travelers mixed with few fellow passengers. Now all of this is changed. A man may receive an infection in San Francisco or London and reach New York before showing signs of illness. A child may contract diphtheria or scarlet fever from some other case upon the cars, and the two be separated many days before either shows clear evidence of the malady. An infected rat might climb into a car in Seattle and die while in transit to Chicago, and the fleas escaping might easily infect a new rat at the point of destination without arousing immediate suspicion.

The farmer gets milk on his own farm. In the small village one neighbor sells the product of his cow to others who have ample opportunity for knowing of the presence of a case of infectious disease in his family, or of the suspicious condition of his cow. In the larger village the residents are supplied from some farm in the vicinity, and a possible infection there would at the most expose relatively few people. In all of these cases the dairy farm and the consumers are under the jurisdiction

of a single health department, or at the most, of adjacent health officials.

In the modern city the case is very different. The milk from many farms, perhaps hundreds of miles away, is gathered into a single bottling plant. There a pailful of infected liquid may inoculate several carloads. The time consumed in transportation affords ample opportunity for the multiplication of harmful bacteria. The source of infection may be even in another state from the place which becomes secondarily infected. This greatly complicates the question of authority. It shows the necessity for a state or national supervision of the problem with full coördination for all local health officials. It is no longer a merely local affair, and under the control of a single local department.

There is another point in connection with the milk industry. In the country community the milk reaches the consumer within a very few hours after it leaves the cow. In fact, it may be delivered before it has lost the animal heat. Now it is very difficult to draw milk from the cow and not have some bacteria in it. As a rule,

the number of bacteria ordinarily decreases for about four or five hours. Then they commence to multiply, and for a time they propagate almost in geometrical ratio. If, then, it be delivered to the consumer within four hours of milking, even with little precaution it will be unlikely to contain many bacteria, and with usual care the consumer may use it before the ordinary bacteria have caused it to sour or become rancid. Much of the milk of a big city is from forty-eight to sixty hours old before it is used, and a few bacteria may thus have become much more numerous than it is pleasant to consider. Often the milk spoils before it can be used. This means that the care of the milk must be much more strictly sanitary than is necessary for the country community. It means that all the conditions around the stable and milk house must be of the very best. The milkers must wash their hands after they have thoroughly cleansed the cattle and before milking, and they should wear spotless white clothing, and in other ways exhibit "surgical cleanliness." Incidentally it means that the

farmer must be paid more for his product, so that he can afford to spend the time and invest in the machinery necessary for the production of good milk. The small milkman can not afford to compete thus with the honestly conducted large company. It is a fact that the small dealers around a large city are the greatest trouble to the health department. They do not need many bottles, for example, and so buy from junk dealers. Often they thus come into possession of bottles which have been discarded by other dealers, or have been picked up by the rag pedlers and sold to the junk men. These small dealers generally have no education or training which fits them to appreciate the distinctions in the care of their product. They have imperfect appliances.

If milk be heated to the boiling point and kept at that temperature long enough all bacteria will be killed. It is found, however, that such milk has lost some of its food value. It is less easily digested. It is found that such a temperature is not necessary. Simply to bring it to that degree of heat will kill most of

the disease-producing bacteria, but the more approved system is to heat it to 140 degrees, and hold it there for twenty minutes. This is pasteurization. Commercial pasteurization consists in simply bringing it to the desired temperature and immediately cooling it. This method has proved quite uncertain. One small dairy, endorsed by several good physicians who were not educated in public health methods, was supplying a hospital with "pasteurized" milk, but inspection showed that the process consisted in setting a can on the stove and occasionally stirring the contents with a stick, or a not too clean ladle. The result of this method was that some portions of the contents would be over heated, and others under heated. The milkman was honest and willing, but he simply did not know any better, and he could not afford to invest in a proper machine. Cans from that dairy were seen at the railway station, waiting to be returned to the farms. They were unsealed, and covered with flies. The very presence of the flies showed that the cans had not been satisfactorily cleaned. Those cans came unsealed

by the cars, and sometimes a thirsty baggage man would dip therein the cup which he kept handy. Such are some of the conditions which occupy the attention of the modern defender of the city health.

The relative number of bacteria in milk is not of itself a reliable indication of the safety of the article. Some bacteria are highly dangerous, while others are harmless. The presence of the lactic acid bacilli may be a good indication, even though the number be great. Their presence is necessary in the making of butter, and they tend to prevent the growth of putrefactive bacteria. On the other hand, the presence of the colon bacillus is evidence of dangerous contamination, while a single germ of diphtheria or of the tyrotoxicon producer is sufficient to make the use of the article alarming. Of course, it must be remembered that not all the bacteria are isolated in an examination, and the presence of one of a certain kind is pretty sure proof that many of its friends and relatives are not far away. However, an exhaustive search for the different germs is a

practical impossibility as a routine practise. The presence of many bacteria shows relative carelessness in the handling of the article, while fewness of bacteria indicates care and caution. It is ordinarily the careless operator who gets dangerous infection of his milk.

Formerly the health officer waited until some case of infection developed in his community; or perhaps he instituted a blind quarantine against an entire section. To-day the health official anticipates the danger, and thus interferes as little as possible with commerce. He attempts to keep posted as to conditions on the farm, and if there be a case of infectious disease present he intensifies his watchfulness. He not only sees to it that the patient is so isolated that there is no probability of infecting the milk, but he keeps especial watch over the places where that milk is delivered. In view of the fact that the place of production is far removed from the place of consumption, some coöperation should be arranged between the officials watching over the respective territories. If an officer in a dairy district finds a case of scarlet fever or

diphtheria upon a milk farm he should at once, in addition to taking the needed local precautions, notify the central office of the state, and also notify the offices in the territory to which the milk is sent. To do this effectively it is necessary that he have on file the list of stations to which the output of the local bottling plant is sent. Such a process, in the place of interfering with trade, is a safeguard. The buyers feel that they are being treated "on the square," and assist in "watchful waiting" of a good kind. When, however, as sometimes happens, the local authorities connive with the producers to keep quiet and run the risk, they are running a tremendous hazard, which must soon be better recognized by the courts. They are like the captain who overloads his boat. He may do it thousands of times without being caught, but when caught, and many deaths occur, the business is ruined. Even state officials have been known to connive at such rascality, and to assist the producer to get his condemned milk to the market in some other way. Some politicians do not want to have honest and com-

petent health officials, though they may make a big ado and spend much of the public funds, especially in prosecuting minor offenders.

Experience demonstrates that it is not safe to depend alone upon inspections of the dairy district. A check test must be had, and in practise that check test is now the percentage of bacteria. Formerly the quality of milk was judged entirely by the chemical composition—by the amount of cream and water. Now, while the old tests are made, they are considered of less sanitary importance. Both the chemical and bacterial tests require the use of a laboratory, properly equipped. Because the office is so equipped it is called upon to make other tests. The fact that water is added to milk does not make it harmful, unless the water contain injurious substances. Oleomargerine was unknown to our grandfathers. It may be far safer to use than dairy butter, but its sale as butter is a fraud. Lard adulterated with cottonseed oil is a commercial deception. Spoiled tomato pulp, treated chemically and sold as ketchup, may be both an imposture and a dan-

ger to the public health. The same is true relative to meat which has been preserved with chemicals. These tests naturally fall to the health laboratory, and it would surprise most people to know how many cases of such trickery are discovered, though since the national Pure Food Law went into effect there has been a manifest improvement.

There is a tendency to make the health office the scapegoat of governmental activities. At the best, an honest official meets with many enmities and condemnations, and it seems a pity that he should be loaded with other matters which only take his time and attention, and intensify opposition to him and his work. Any man who attempts to "put something over" and gets caught feels a resentment against his captor. Really the fact that grocers and market men frequently sell short weight is no concern of the health department; but in the course of tests made the department frequently detects these shortages. Under such circumstances when they have reported the fact to the city government they have been told, "It is your

duty to bring prosecution." Generally it is not the specific duty of the health department to bear the brunt of such action, and it never should be expected, though the office may reasonably assist by giving evidence. To turn this work over completely to the health department is as unfair as certain practises on the Canal Zone. The hospitals of the Sanitary Department acquired a favorable reputation through Central and South America, and very many patients came to receive treatment. They were encouraged to come, and were charged a dollar or two a day; but while the Sanitary Department had to bear the expense and the anxiety of the cases, and its servants were obliged thus to use their time, in order to make the relative accounts of the two departments show as much as possible in favor of the Engineering Department, all moneys thus paid in were credited to the Engineering branch of the service. Likewise, because the only competent embalmers were in the Sanitary Service, when the president of the republic of Panama died the Sanitary Department was called upon to embalm

the body; and though the family paid considerably more than a hundred dollars for the operation, it was credited to the Engineering and Construction Division.

These changes in social and economic conditions have brought into greater prominence certain principles of law, or have brought new applications. It is an old principle found in Blackstone which recognizes the fact that one may not poison a stream to the detriment of those below. Still, it has long been the practise of cities to get rid of their sewage by turning it into a convenient river. People sometimes have imagined that such a practise secures for the city a right so to do; but as cities increase in size, and as they become more closely situated, such use of streams becomes dangerous. There are many recent decisions holding that no previous use of a stream for the discharge of its sewage gives to it a right to continue such use; and if such right be admitted, still the fact that when it was a village or a small city it emptied its waste into the stream, by no means gives a similar right to the large city. Further, though

damages may be awarded in an action, that does not preclude the enforced abatement of the nuisance. On the other hand, there are cases in which it has been very rightly held that a district may not be enjoined from discharging its sewage into a stream, simply because it is sewage, when in fact the stream is made more pure in consequence. When the sewage has been properly treated it is not a nuisance; and what that proper treatment is, and when it should be instituted, must be a matter for expert decision. For the city discharging its sewage, and for the city lower down the stream, their respective health departments must be looked to for guidance.

While the principles upon which these decisions rest are old, in former times they would not be taken to apply to the action of municipalities. They were only enforced against private individuals or private companies. Now, however, we find the courts asserting in no uncertain tone that a city has no more right to pollute a stream, than has a private individual. To change a city's sewage system under legal

pressure may be a very serious financial problem; but it may be accomplished gradually. It is the health department of the city which must generally be expected to watch conditions and anticipate such possible trouble, even though the sewers be in the care of a Public Works office. The two should work in harmony together, but ordinarily the health office is the only one which has a laboratory equipped for such studies.

The changes in social conditions not only necessitate a change in city work, but they also necessitate greater caution on the part of the city administration. When cities were small and not numerous it was an easy matter to get a good and safe water supply. Now such a supply must be constantly watched to preserve its purity, and the department must be prepared within a few hours to institute protective operations. The watching must be done by the health department, and must be done intelligently. Until very recently there have been no suits to determine the liability of a city for providing water which spreads typhoid

fever. The maintenance of a system of water supply is a commercial venture, and for negligence in connection therewith the municipality is liable, even though it may not make a profit.[1] A city is therefore liable for damages for sickness and death caused by such infection.[2] Nor is it sufficient excuse that the conditions are unusual, as from some break in a sewer, a flood which could be guarded against, an unusual change in the wind, causing the water of a lake to take an unusual current, carrying sewage to the water intake. It is the duty of the city to anticipate such conditions and protect itself from them.

The writer's attention was recently called to a very peculiar case of water pollution, which illustrates both the importance of changed economic conditions and the necessity for efficient health administration. In a corner of a city most distant from the pumping station, complaint was repeatedly made that the public water was so offensive that even the horses and

[1] Pearl v. Inhabitants of Town of Revere, 107 N. E. 417.
[2] Milnes v. Huddersfield, L. R. 10 Q. B. Div. 124; Keever v. Mankato, 113 Minn. 55.

cattle there kept refused to drink it. Such complaints did not come from other sections, and general tests of the supply showed it to be free from contamination. In that section, however, the water was apparently contaminated with manure. Investigation developed the following conditions. There were in that outlying section several large greenhouses devoted especially to the growing of market truck. In three there were tanks connected with the city water system. It was a custom of the proprietors to use these tanks for making solutions of fertilizers, and then, having shut off the city pressure at the meters, either by natural pressure, or by the use of power pumps, to force the solutions through the pipes which were ordinarily used in watering the plants. Owing to the great distance from the city pumping station, and the natural elevation of the land above that of most of the city, the city pressure is lower in that section of the city, and during temporary fluctuations it may sometimes be reduced almost to zero. Under such conditions if the greenhouse-man fails effectually to shut

off connection with the city mains before starting his manure pumps he may easily force his solution into the city mains. Incidentally we may remark that this practise of spraying growing lettuce with liquid manure introduces another danger—the contamination of the lettuce; and even after thorough washing such lettuce may have an unpleasant taste, and be the carrier of colon or other bacteria.

The mayor of a certain city expressed regret that the city was not able to increase the compensation of a medical officer of health sufficiently to employ his full time; and immediately thereafter, being obsessed with the idea of the "commission form of government," but not grasping its real meaning, that same mayor forced the passage of a new ordinance, creating a new office, and placed a former police officer in charge of the health department, although the new appointee was totally lacking in any education or training which would fit him for such a position; and every "improvement" which he instituted was ill advised. Objection is frequently made on financial grounds

by city officers to the maintenance of a proper health department, in charge of a trained sanitarian; or to the building and equipment of a needed filtration plant for the water supply; or the construction of suitable systems for the care of the sewage; or for the disposal of garbage. It matters not to them whether or not the expenditure will save to the citizens more than they cost, in sickness and funerals avoided. The average city father wants to make a good financial showing, and he is "willing to take the risk." The owners of the Eastland wanted to make a good financial showing and they "took the risk." Government inspectors wanted to encourage the steamship business, and they "took the risk." Is the city official any less guilty when for financial reasons he fails to take the needed precautions for the preservation of the citizen's health? In Keever v. Mankato the court was asked not to find against the city as such judgments, if encouraged, would bankrupt every city. If cities do not heed the warning given in the few cases already decided, should they not be bank-

rupted? While these conditions are officially in charge of the elected officers of the cities, the real responsibility rests upon the individual citizens. They must eventually pay the bills, and it is for them ultimately to decide whether they prefer to pay their taxes for judgments and poor public service, or for good service entirely.

These suits for damages for the distribution of such disease germs in the water supply, or for the pollution of streams, etc., will be more common in the future than in the past, for they are the natural outcome of the increasing population, and consequent necessity for greater caution.

Good roads are desirable, but they are no more needed than good health in the community. Money spent in buildings and public parks makes a good advertisement for a city, but a reputation for healthfulness is worth quite as much. Of course, public parks are among the health measures of a city, but what we here referred to is the expenditure in raising fine flowers, in landscape gardening, and the main-

tenance of fountains and zoölogical collections. Embossed letter heads for all the offices are very nice cards for the city administration; but if they are obtained at the expense of efficiency in a health department they might better be dispensed with. The health department has been neglected too long. It has been stuck away in some uncomfortable corner, without proper equipment of men, or of laboratory apparatus, or of library. In a city whose annual appropriation bill is about $415,000, the writer has found the employees in the health department forced to wear overcoats while working in the offices in the winter, and one day he found the contents of the laboratory actually frozen, though complaint had been made for several weeks of the condition of the office. And yet, that particular office is probably much better provided for than most health departments in cities of a similar size.

Although vital statistics are the bookkeeping of the health department, and although the records are very commonly and properly kept in that office, still the chief use of the individual

records is legal and commercial. The transcript of a death record may be needed for life insurance, proof of title to property, or for legal evidence in a variety of other cases, perhaps long years after the record was made. This use is more common now than formerly, but not on account of special changes. On the other hand, there are very many new needs for certificates of birth, and the demand for that kind of evidence for old purposes is more common. Such certificates have always been useful in proving right to property—proof of heirship, and many American-born children have lost their title, especially to property in Europe, through lack of such documentary evidence. There is an increasing demand for such certificates as a proof of right to enter school. The great increase in legislation relative to child labor has made it often impossible for a boy, or a girl, who is unable to produce a copy of the legal birth record, to get a chance to work, no matter how much it may be needed. In fact, some of the laws require the filing of such copies of birth record.

This matter of individual records is here mentioned because in many states there is no satisfactory law governing the recording of births and deaths. The result is that the matter is neglected. Records of deaths are more likely to be made than those of births. Most physicians do not appreciate the necessities of the case, and for one reason or another they simply neglect it. It is the *legal duty of the physician* to make the record, but it is the *moral duty of the parent* to see that the record is made. An Indiana young lady was only able to prove her age, and her consequent right to certain property, because a neighbor happened to remember that a calf was born to a blooded cow on the same day that this baby girl first saw the light. The cow was of enough commercial value so that its birth was recorded in the farm book, but no record of the girl's birth could be found. In another instance a well-to-do mechanic died, leaving his wife and child with small means. Soon after this they were rejoiced to learn that the little girl had inherited sufficient property in the old country to care

for both. Unfortunately there was no official record of the child's birth, and the attending physician had died so that the record could not be legally made, and the inheritance was lost.

While it is the duty of the attending physician to make the record of birth, and it is the duty frequently of the health office to receive and record such certificate, it is the duty of every parent to make sure that the legal record is completed as to the birth of each child. Legally, until such record is made the physician has not completed his care of the case, and is therefore not entitled to his fee. This matter is here mentioned because many do not appreciate the necessities of the matter until it is too late.

CHAPTER VI

CHANGES DUE TO ADVANCEMENT IN SCIENCE

In the older time few diseases were recognized as being communicable from one patient to another, either directly or indirectly. Those which were so regarded were all handled in the same manner in the work of protecting the community. The case was isolated, and no one from the outside was permitted to approach. Fences were often built around the house, and a guard was stationed to enforce quarantine. If it were necessary to furnish provisions, they were brought to the doorstep and there left, and after the messenger had departed some one from the house came out and got them. It was supposed in each case that clothing, or any thing which had been in the room with the patient would convey the infection. Diagnosis was not definite, but was a matter of judgment, based upon the combination of symptoms. We

now know that very many cases which were formerly called malaria were unquestionably typhoid fever. Diphtheria and membranous croup, now known to be due to the same bacillus, were then considered distinct diseases, and even after the diphtheria was recognized as infectious, the croup was not so considered.

Some diseases, like yellow fever, were the subjects of much discussion. Some authorities considered that fever infectious, while others very stoutly insisted that it was due to unfavorable surroundings. We now know that both were right, though neither was right in their exact suppositions.

The first great advancement was made when it was discovered that many diseases were the product of specific germs. Some rashly claimed that all diseases were caused by microscopic plants called bacteria. The specific bacteria were so definite in character that a diagnosis could be made from them. Later it was learned that the diagnosis could be often made much more accurately and surely, in many cases at least, by certain tests of the blood of the patient.

It was learned that the symptoms were generally caused by a poison produced by the germ, rather than by any direct effect of the germ itself. Then it was found that an antitoxin could be produced, which when injected into the patient neutralized the poison, and thus tended to cure the patient. That same antitoxin introduced into a healthy person produced an immunity to the disease, and as a routine practise the use of antitoxin was depended upon to protect all who had been exposed to the disease. Now it is known that not every person is susceptible to the disease, and in the case of diphtheria, for example, a definite test has been found to determine this point. In that way the use of antitoxin as a prophylactic has been materially decreased. This is important, for it has also been discovered that the use of the antitoxin may render the patient unduly sensitive to future injections of serum from the same species of animal. Antitoxin is always secured in the serum of another animal, generally from the horse. Further, it has been learned that the virulent germs

may be present in an immune person, without any symptoms being present. The antitoxin may cure the disease without killing the germs. Finally, the immunity of a person is to specific diseases; he may be immune to the effects of diphtheria, and still be very susceptible to typhoid fever.

It is very apparent that since every patient is a possible source of infection for others, the danger to the healthy members of a community is in direct proportion to the number of the sick; and every person cured therefore by so much protects the community. However, it is not distinctly the province of the health department to treat the sick, especially when they have their own physicians. It is a duty of the guardian of the health to keep watch of the treatment. It is the province of the health official, not of the attending physician, to determine when the case is officially well and safe to be given freedom. This fact often causes friction, either between the attending physician and the department, or between the department and the family. There is a very decided

difference between the recovery from the disease, and the official recovery, when the patient may be given unrestricted liberty. Thus it has been found that many weeks after recovery from diphtheria the patient may still be a potent source of infection for others; and some typhoid patients remain carriers of the disease, and sources of epidemics, for many years.

Some years ago in Washington it was found that there was a sudden increase in typhoid fever. Investigation showed that the epidemic was connected especially with two milk depots. Both received their supply from the same farm. Inspection showed that every thing on the farm was above suspicion, except— The farm was owned by a widow who had typhoid fever seven years previously, and upon testing her she was found to be a typhoid carrier. Near the house was a clean and well-kept privy, but it was not fly proof, and flies were traced from that pit to the milk cans which were exposed to the sun and air after being scalded. This was the source of the disease. This instance illustrates three forms of disease carriers. The

woman was constantly producing the disease germs, and flies acted as mechanical carriers; the milk served as a culture medium, in which the few bacteria left by the flies in the cans became millions before the milk was used.

The bacteria escape from patients in different ways, and herein lies a distinction in the form of quarantine to be used. The germs of diphtheria are in the expired air, and in the discharges from the nose and throat. The bacilli from the typhoid case are chiefly found in the discharges from the bowels and kidneys. A typhoid case is not properly isolated unless all discharges are thoroughly disinfected.

The immunity induced in a patient by injections of antitoxin is temporary, and as has been intimated it may not always be entirely safe. Typhoid bacilli, carefully grown in the laboratory, isolated and killed, when injected into a healthy person induce an immunity to that disease which lasts for some years. This is safe and effective, and as a result of its use typhoid fever has been practically eliminated from the army. Its use in the case of every individual

exposed to infection, or likely to be exposed, is a strong aid for the health department.

The bacillus of the bubonic plague is carried by the flea to the rat, and the rat becomes infected, and so infects other fleas. Thus the disease is spread among the rodents, and in time it comes back to some human beings. From the rat it also is communicated to ground squirrels and other animals. When a case of the plague occurs, quarantine consists in first isolating the patient, and killing all insects found on the premises, generally by the use of a thorough fumigation with sulphur fumes. In addition, beginning at a little distance and with that case as a center, from all directions the entire territory must be searched for possible sources of infection. Every rat must be caught and examined, taking care that no fleas can escape. If the search began at the patient the rats might escape to infect others.

Whenever a case of infectious disease is discovered it is the duty of the health department to make an immediate and thorough search to discover the source of the infection, and the

steps to be taken will be largely determined by the results obtained. This search for the source of infection is not to satisfy curiosity, nor to furnish a scientific record, but to enable the department to act intelligently. Still, some health officers have made those investigations after the epidemic has spent its force, and apparently more as a matter of record than anything else. This is not ideal service, though nevertheless to be commended. However, investigations made after the epidemic yield less satisfactory results than at earlier dates.

Bacteria are not the only causes of disease. Microscopic animals—protozoa—are the morbific imps for many ailments. Some have been studied very carefully under the microscope, and their life history is fairly well known. Others are so small that they can not be seen, except possibly by the ultramicroscope, a relatively new invention. They are judged to be protozoal in nature from the fact of resemblance in manner of reproduction to those which have been studied.

The plasmodium of malaria is reproduced in

two ways. In human blood it usually multiplies by asexual means. The little plastid gains entrance into a blood cell and there grows fat. When it has reached maturity it forms within itself several new plastids, and then bursts, setting them free. As the mature plasmodium is in a blood cell, when it ruptures it also breaks down the blood cell, and the little plastids float about in the watery serum. Each mature cell produces from six to twenty plastids, but many of them die without doing harm. Since the conditions under which all are living are the same, and the time for maturing is practically uniform, it follows that in each generation all the descendants of a single ancestor come to maturity at the same time. Ross finds that when the number of cells maturing amount to 150,000,000 in a man weighing 142 pounds, the time of rupture is marked by a chill of the patient, followed by fever. Thus, considering that the cells multiply tenfold in each generation, if 1,000 cells of the tertiary species, maturing every second day, be injected, the chill will appear about the twelfth day. The period be-

tween the inoculation and the chill is called the period of incubation. Thereafter, every second day there is a chill, followed by the fever, as long as the reproduction of the plasmodia continues sufficiently. So many blood cells are destroyed that the patient loses his healthy color, and becomes pale and anemic. This form of reproduction is called sporulation.

Some of the spores develop sexual characters, and when taken into the body of an anopheles mosquito they mate and begin sexual reproduction. This gestation requires about eight days. The anopheles mosquito likes to live around clear water, containing grasses and algæ. Its natural food is the juices of plants. The male mosquito can not bite, but the female is armed with a lancet. When she has reached her growth she needs a drink of blood before she can develop her eggs. She accordingly seeks some animal, and after gorging herself hastens back to the water to lay her eggs. When she wants to lay some more eggs she returns to get another drink of blood.

It will thus be readily seen that the chance

of spreading the infection of malaria is based upon certain mathematical data. There must first be in the community some person containing the sexual forms of the plasmodium in his blood. The danger is greater the larger the number of infected individuals. The danger varies with the relative number of mosquitoes as compared with the population. These points determine the chance that the patient will be bitten. Then after receiving the infection that individual mosquito must live a week and thereafter bite another person who is not immune. These chances are decreased with the increase of distance from the breeding places to the people. The presence of bushes and high grass between the breeding places and the people, in which the mosquitoes may rest in their flight, increases the danger. The danger is lessened by the reduction of the relative number of germs in the source of infection.

Protective measures against the disease consist in treating the sick, to reduce the number of plasmodia; feeding quinine to the well, to make their blood unfavorable for the develop-

ment of the germs; keeping mosquitoes away from the patient, and killing all of the insects that have found access to him; destroying the breeding places of the insects; clearing away their places of secretion, such as grass and bushes. The method used for the extermination of the insects varies very greatly according to circumstances.

In the absence of the anopheles there is absolutely no possibility of the spread of malarial infection so far as has been discovered. Under such circumstances, the health official need do nothing more than await developments. He should, however, even in the absence of the malarial infection, know the kind of insects in his vicinity, and their usual breeding locations. In a malarial region, on the contrary, it is important that he keep constant watch of the malarial index of the jurisdiction, and that he wage a constant warfare both against the germs and against the mosquitoes.

The following diagram, modified from one designed by Doctor Carter, of the Public Health Service, shows at a glance the various

RESTRICTION OF MALARIA

- I Getting rid of Anopheles.
  - 1. Protection of
    - (a) Insect-eating birds.
    - (b) Propagation of bats.
  - 2. Destruction of shelter.
    - (a) Cutting away brush, weeds and high grass.
  - 3. Destruction of breeding places.
    - (a) Draining and filling.
    - (b) "Training" streams.
    - (c) Oiling or fouling.
    - (d) Propagating fish.
- II Protection of well men from mosquitoes.
  - 1. Screening houses.
  - 2. Screening beds.
  - 3. Personal screening.
  - 4. Trapping and killing mosquitoes, especially in houses.
- III Preventing infection of mosquitoes.
  - 1. Treating patients until completely cured.
  - 2. Keeping patients under mosquito bars in screened houses.
- IV Immunizing people against malaria by constant use of quinine.

measures which are used for the restriction of malaria, and, with slight changes, those which are applicable against yellow fever. Anopheles mosquitoes breed in ponds, whereas the stegomyia insects are likely to use cans and other receptacles around the house. Against yellow fever, therefore, it is especially necessary to clear the yard of tin cans, broken crockery and such small receptacles for water, and to screen cisterns.

There is so much to be discovered in regard to the transmission of disease that the live health officer must watch developments all over the globe. A disease not known to exist in the hemisphere may at any time be imported in the body of some globe trotter without arousing suspicion. Perhaps he may be nearly immune, but others may yield readily to the new infection. Moreover, the methods used in a foreign disease may be instructive in the handling of some other near at hand. The sleeping sickness of Africa has developed some interesting facts.

The central portion of Africa, practically

from coast to coast, has been scourged by the ravages of the sleeping sickness. Whole districts have been depopulated by its ravages, and the inhabitants have been driven from others to prevent their destruction. This disease is produced by a protozoön called a trypanosome. It is carried from patient to victim by the tse-tse fly. If the fly bites a patient afflicted with the disease, and thus becomes itself infected, it may directly communicate the disease to another person by biting within about forty-eight hours. Then for some seventeen days it is unable to communicate the disease. Then again it becomes an infective agent, and continues such for about two months. In the first forty-eight hours it is a carrier of the infection just as the fly carries typhoid, or the flea transports the bacillus of the plague. Then comes the inert period when the trypanosome is undergoing sexual reproduction, as the malarial and yellow-fever germs develop in the bodies of mosquitoes. There is much evidence that this trypanosome is also developed in many other kinds of animals, being very fatal

for horses. This makes the work of extermination very difficult. Still, the smaller the number of human patients the less will be the danger of the spread of the infection. It is found that normally about ninety per cent. of the cases die. However, by injections of an arsenical compound known as atoxyl the trypanosomes are frequently killed, and eighty per cent. of the cases recover. It is found that if the atoxyl be not given in sufficient doses to kill the trypanosomes at once, those little animals develop an immunity to the action of the drug. It therefore follows that if the treatment be used skilfully and successfully the danger of the spread of infection is decreased; but if it be used in too small doses a race of immune protozoa is developed which are more resistant, not only to the atoxyl, but to all arsenical compounds.

A very important part of the health officer's duty lies in the extermination of disease carrying pests. The development of the science of public health has changed the legal application of old forms. Formerly a manure pile was

considered a nuisance if it were large, or if it were sufficiently near so that it could be smelled. Now we know that the effluvia arising from the pile are not injurious to health, but the manure piles are the breeders of flies and rats. Flies and rats are carriers of disease, so that the manure pile is a nuisance in proportion as it develops these pests. A newly-hatched fly can fly five or six hundred feet, and with the aid of the wind it may go much farther. Whereas formerly a pile of manure was only a private nuisance, and within a very limited distance, now it must often be recognized as a public nuisance, and at any point within six hundred feet.

When the principal objection to a manure pile was its effluvia, it was a nuisance largely in proportion to its size, for the larger it was, and the more rapidly it accumulated, the more did it develop fermentative action producing the heat and gases. However, in a rapidly increasing pile the outside is too fresh for the development of the larvæ of the fly, and the interior of the pile is so hot that it burns and kills

them. The prolific fly breeding pile is one often which one must search to find, one which takes a month in which to accumulate a bushel-basketful. The little pile is therefore a great nuisance, though it may not offend either sight or nostril.

The development in the science of public health has thus increased the number of diseases to which some form of quarantine is applicable; it has greatly increased the different ways in which the functions of health protection must be exerted; and it has changed the application of legal principles. That is to-day regarded as a public nuisance often times, which before would either have been no nuisance, or would at most be only a private nuisance. New facts are being constantly discovered, and every epidemic must be carefully studied. The mechanical observer of prescribed rules is of little value in public health work. The ideal officer must be level-headed and original. He must also be an enthusiastic student, and must not be misled by superficialities. Sometimes he must work through authority; sometimes by

education and coöperation. A pond had been created by the erection of a dam and a dyke. Complaint was made that it bred mosquitoes, but the superior powers of the city government refused to act, or authorize action, because they did not wish to offend the owner of the land on which the pond was located. Examination, however, showed that the real nuisance was not on that land. Water had seeped through the dyke on to some railroad property which was covered with elderberry bushes. Though the railway corporation was in no way responsible for the production of this breeding place of the pests, the matter was explained to the road-master, and the next day a gang of men cleared away the bushes and filled in with a couple of train loads of gravel.

The discovery of the relationship of rats and flies to infection has intensified the importance of properly caring for the garbage of a city or village. It must be kept in closed metal or stone receptacles, protected from both rats and flies. Garbage cans may be easily injured or stolen, so that in some places it is a custom to

construct the receptacles of concrete, with a tight-fitting top which dogs can not remove, and with a door at the bottom through which they may be cleaned.

Dogs, cats, fowls and pigeons must always be remembered as possible carriers of infection, and treated accordingly. Under the old ideas of the fathers the work of health protection was very slight as compared with the present; but it was also ineffective. Now many diseases which have defied the art of man for centuries are rapidly becoming extinct, as the result of making practical application of the facts developed in modern sanitary science. Most of these results have been attained quietly, and with little attraction of attention until the end has been attained. Often, especially by politicians and would-be sanitarians, those accomplishing results have been denounced, and their methods derided. "He laughs best who laughs last."

With the scientific advances certain old practises and ideas have either been abandoned or greatly altered. In the place of isolating a yel-

low fever patient from his friends, and building a fence around the house, now he is at once enclosed in mosquito-proof netting, and all stegomyia mosquitoes within the house are most carefully captured or killed. After three days the quarantine may be relaxed, though the warfare against that species of mosquito must keep up for the balance of the season.

Probably fumigation may be much more efficient against some infections than for others, but there are many (and the number is increasing) sanitarians who regard fumigation as a deceptive prop. Experiments show that the bacteria are more likely to be on the floor than on the ceiling, and practically the number found on the side wall increases as the examination progresses toward the floor. Bacteria or their spores, protected perhaps in a crust of dried sputum, and hiding in a crack of the floor, are very difficult to kill by fumigation. The antisepticizing will be much more efficient by making use of a hot caustic soda solution with a scrubbing brush. It is entirely useless to depend upon domestic fumigation. The amount

of sulphur or of formaldehyde used is almost without exception far too small to be effective. It is probable that the most valuable action of fumigation is the extermination of insects which may carry the infection, and the destruction of mice, rats and other pests. While it seems probable that the formaldehyde vapor is most efficient against bacteria, as an insecticide it is inefficient. It simply makes the flies and other insects drunk. They may be swept up, and destroyed, but if the room be left too long without opening it to sweep up the insects they will probably be found in their usual health.

For the extermination of the vermin, burning sulphur fumes is most efficient, and in the inspection service of the United States sulphur dioxid is the one thing upon which dependence is placed for the killing of rats in the hold of a vessel. It is often claimed by ship owners that such fumigation is not necessary on account of the presence of an efficient rat killing cat. Some time ago one such ship was sealed and fumigated, and when she was opened dead rats were found in every part of

the ship. By the irony of fate, in the cabin they found the excellent ratter who had by some accident been left, and with her there were twenty-four dead rats.

Formerly we heard much about the deadly character of sewer gas. The plumbers succeeded in having all kinds of plumbing ordinances passed, which greatly increased the cost of work, without benefiting any but the members of that guild. Some time ago, under the auspices of the Massachusetts State Board of Health, and of the American Engineering Society, most careful tests were made, and no detrimental gases were found to come from sewers. Bacteria fall, they do not rise. This has been known since the days of Tyndall. What does sometimes happen is that the traps become breeding places for mosquitoes, and the more complicated the plumbing, the more likely is this to occur. In consequence, it is doubtful if some of these ordinances regulating the plumbing houses would to-day stand the test of the court. Unless an ordinance be based upon fact it is arbitrary, and without such

foundation it would lack one essential feature of legality, namely, reasonableness.

It was formerly customary in some places to require that the house sewage or at least the kitchen waste, be run through a tank before being connected with the sewer. This tank, catch-basin, or cesspool, was ordinarily a form of settling or septic tank. Sewage entered it, and the more solid particles dropped to the bottom, where the bacteria could digest them. A heavy scum collected on top. Now we know that such cesspools need constant watching by competent observers. They may work efficiently for many years without being touched. When, however, they are cleaned, it takes time to get a new crop of bacteria developed sufficiently to do the work. A septic tank when first cleaned does not do what it is expected to do; but as long as it is working efficiently it should be let alone. Yet, these same unselfish plumbers secured ordinances requiring the frequent cleaning of cesspools. *Cesspools should never be cleaned unless under the supervision of the health department.*

There is another strong objection to the individual cesspool. Not only are there so many in a city, under such ordinance, that they can not be properly watched, but the expense of construction and maintenance is enormous. With only a fraction of the total cost of the individual cesspools, a much more efficient Imhoff tank could be constructed to take care of all sewage in a trunk sewer, where with comparative ease it could be watched and kept in operation. The cost to the people is less, and the efficiency is increased. The danger of sewer gas is an exploded bubble.

CHAPTER VII

MEDICAL INSPECTION OF SCHOOLS

THERE is room for much difference of opinion whether the medical inspection of schools should be under the auspices of the department of health, or wholly under the control of the school management. Both departments are interested in the matter, and clearly the effect of such inspection should be an improvement in the health of the community. There may be a difference in the work which it is sought to accomplish, and this would go far toward deciding who should do it. Whoever does the work, there should be hearty coöperation between the two organizations. Although the present movement originated in the work of health departments, and although very much of the service rendered has been strictly health department work, still it is the opinion of the writer that the work is essentially educational,

and that it should be provided and controlled by the school management. He believes that in this way more good can be accomplished, and with less serious objection.

School inspection as a routine procedure is a relatively new matter. For many years it has been the custom in many sections to make occasional inspections to detect the presence of cases of infectious disease during epidemics. Scholars have been sent from school to get certificates of health, generally from the family physician, when for some reason the suspicions of the teacher had been excited. During an epidemic of smallpox, or even the presence of a single case in a village, it has been the practise in many places to send physicians to the school to inspect for evidence of vaccination, and to perform that operation on those not thus protected. While generally these occasional visits of a medical school inspector have been instituted by the health department, sometimes the school board has taken these steps for its own protection.

According to the laws of some states it has

been the duty of either local health authorities or the state board of health to inspect school houses, and to examine and approve plans for new buildings. Authority has sometimes been given to the health authorities to condemn a school building on sanitary grounds, and by the laws of some states it is definitely required that certain provisions be made for the health of the children. The right to condemn a school building on sanitary grounds does not include the right to cause its destruction. It simply prevents its use as a school until the sanitary provisions be complied with.[1] Even if not used as a school the building might be used for some other lawful purpose, and the medical or health officials have no authority to compel its destruction.

The medical inspection of schools as at present practised in the United States is very different from either of these former forms of inspection, though including them. Gulick states that only about four per cent. of the cases needing attention were excluded on account of

[1] Coal Creek Township v. Lewandowski, 84 Ind. 346.

infectious diseases. Almost all the attention in good medical inspection of schools is devoted to other matters, though in point of time inspection for such diseases is put first.

Experience has demonstrated that when a child has been absent from school, especially on account of infectious disease, it is unsafe to permit that child to return until the case has been properly investigated by the school doctor, or the school nurse. It is not safe to permit teachers to accept the certificates of the attending physician. While out of courtesy a medical inspector may thus accept a practitioner's certificate, it should be distinctly understood by both the physician and the family interested that it is a matter of courtesy, and not a matter of right, unless the law so distinctly states. The reasons are that all must be treated alike, and to guard against the unprincipled or careless physician the rule must be made to include all. What is needed is that the responsible official shall be satisfied that the case is safe. On account of their relations with the families, physicians frequently feel obliged to give the pa-

tient the benefit of a doubt. Certificates are given of recovery from diphtheria while the child is still producing the bacteria; and certificates of recovery from scarlet fever sometimes find their way to the school while there is still flaking of the skin of the hands, or while there is still an abnormal discharge from the nose. The writer has found certificates of vaccination given after simply scarifying the skin and applying some cold water. The certificate of vaccination should distinctly state that the operation was followed by the typical evidence of infection with cowpox.

Every time that a scholar is absent from school he interferes with the normal course of instruction for others. The more irregular the pupils are, the less progress can the classes make. The irregular scholar is thus retarding and harming the other members of the class. It is the duty of the school board to make these losses as slight as possible. It is necessary for scholars to be brought close together, and they are at the age when they are most susceptible to disease. In the interest, therefore, of school

efficiency it is expedient that the danger of infectious diseases be reduced as much as possible. Many scholars are unable to keep up with the more advanced pupils, not because of lack of mentality, but because their mental operations are hampered by physical conditions which are susceptible of improvement or correction. Others need to be segregated in order to keep them with those of their own class. They will thus advance more rapidly themselves, and will not retard the average progress. It is clear that the longer a school class takes in making the course, the greater will be the expense to the school district. For these and other reasons, not necessary here to amplify, it seems that the medical inspection of schools is essentially a problem of school management. If a case of infectious disease be found by the examiner it is his duty to the school to exclude the patient, and to take such other measures to defend the school from that source as seem necessary. It is his duty to the community, just as it is the duty of every physician, to report these cases to the department of health

There is no other item connected with the medical inspection of schools which is distinctly the province of the health office. Further, the employment by the board of education, or by the school trustees of a medical inspector of health does not in any way interfere with the inspection by the health office whenever, and so far as, seems necessary. These additional examinations may be made as a check upon the work of the school, or in cases of special danger, or of a perplexing epidemic. It may have happened in the past that incompetent medical examiners have been appointed by school boards, just as in the case of health departments. In case of an accidental difference in the findings by examiners of the two departments there should be a frank interchange of ideas, each giving due regard to the right of the other to his opinion. There should be no contest, or "fight" between the two. If, on the other hand, it proves that there is a distinct incompetence on the part of an examiner, justice demands that the facts be brought to the attention of the proper officers.

In Europe the distinctive relation of school

inspection to the educational work of the school has been generally recognized. In 1842 it was ordered in Paris that, "All public schools should be visited by a physician who, in addition to inspecting the buildings, should also inspect the general health of the children." At present in Paris the school physician is appointed for a term of three years. In addition to examination of such pupils as may be specially recommended to him by the teachers, and investigation of cases absent on account of sickness, he is to make examinations as to the light, heat, ventilation and other sanitary conditions of the school buildings. Once a month he examines the pupils' eyes, ears and teeth, and if defects are found the matter is called to the attention of the parents. Sometimes the school provides glasses, clothing and other necessities for those who are needing them but are unable to provide them.

In Switzerland it has been the custom to have such examinations of schools and school buildings for some time, and especial attention has there been given to the effect of school work

upon the eyesight. Periodic examinations of vision have been made and records kept. The teeth are also frequently inspected, and in case the parents are unable to give proper treatment this is provided, at least in part, by the school.

In Germany the duties of the school physician include the following items: examination of all pupils as they enter the school; in case of physical abnormalities he may recommend special instruction; he investigates cases of absence from school, and in infectious diseases gives special instructions, or advice to the head master of the school; he is expected to advise the school board when he finds the health of the children unfavorably affected by the unhygienic conditions of a school; he is to report at stated times for the purpose of advising with the head master about certain individual cases; and the school physician has control over the classrooms without reference to hours of instruction. All the medical officers of the schools meet together regularly under the presidency of a member of the school board to discuss matters relative to school hygiene.

In the United Kingdom also it is the custom of school boards to provide such medical officers. It was not a matter of growth, but of sudden interest. It was noticed in the Boer War that there had been a degeneration of Englishmen. In 1907 a law was passed by Parliament, which went into effect January, 1908, making the medical inspection of schools compulsory, and specifically imposing the duty of complying therewith upon the educational authorities. The present system is very complete.

"As interpreted by the Central Board of Education, the aim of the English Education Act is not primarily the medical inspection of children, but their physical and mental improvement. The subject of school hygiene is related in every possible way to the public health work, and is viewed as an integral factor in the health of the nation. Doctors, teachers, and nurses work together in the closest coöperation. The aim is not merely to improve the health of the children who are weakly or ailing, but in the broadest sense to conserve the health of all children by adapting and modifying the system of education so as to make it fit their needs and

capacities. No other nation, unless it be Japan, has adopted a school medical service with a more rational conception of its true purpose. In her school medical clinics England has boldly undertaken the free medical treatment of her ailing children, heedless of the criticisms of the medical profession. Her school physicians are as a rule full-time officers, highly trained and well paid."[2]

In Sweden all public secondary schools (corresponding to the use of that term in Germany, not in the United States), had medical officers on their staffs as early as 1868. Though in some cities and rural districts there is a medical service like that required of secondary schools by the general government, that condition is not general in the kingdom. In Denmark some schools maintain such inspection, but not as a compliance with law or general custom. In Norway there is compulsory medical inspection of secondary schools, and the law is permissive as to the establishment of such inspection in elementary schools. Canada, Aus-

[2] *Health Work in the Schools*, Hoag and Terman, p. 286.

tralia, Argentina, Chile, South Africa and many other countries have instituted such inspection of schools. We are told that the school conditions of Ireland are deplorable. One-eighth of the elementary schools are without any toilet facilities. One-third of the schools of Belfast have no playgrounds. The mortality of children of school age is enormous. Again considering the financial side of the problem, what is the use in half educating a lot of children who never reach an age which pays the community for the money spent?

In marked contradistinction from the condition in Ireland, we find that the educational system of Japan is one of the most carefully planned and managed in the world. The nation considers that the health of the school child is one of its most valued resources. If during the age of growth and development there are unfavorable conditions, which retard, stunt or pervert the child's development, mentally and physically, the result will be shown in mental and physical lowering of standard for the nation; but by care during these formative years

the national standard of existence may be elevated. It is far more important to prevent misfortunes than it is to treat them, or support them, after they have been created. By keeping records of the child's height, weight, chest circumference, general nutrition, and of all forms of defectiveness, Japan is collecting most valuable material for study, and her leaders are already making use of this data.

When it is remembered that in the United States the public school is the only governmental department having to do with the lives of children directly, and that nine out of every ten children are subject to this control, extending roughly from the age of six to fourteen, one may appreciate the tremendous influence which may here be exerted for the improvement of the rising generation. Further, a large proportion of the scholars are the children of foreign-born parents, often from the most lowly ranks of society. In the schools these scions of different races and nations are brought in contact with those of native parentage, and the result is a

constantly changing new race, with new standards. With very slight help this period of new blending may be made especially favorable for improvement. Without intelligent supervision the introduction of much foreign material may weaken the strength of the original stock. For example: Reference has been made to the condition of schools in Ireland. Children from families coming out of the unfavorable environment mentioned—for there are fine schools also in the island—do not appreciate the need of certain precautions. Their laxity tends to spread to their fellows, and unfavorable results follow. It was one of those mothers from the Emerald Isle who patiently listened to the doctor's directions relative to the care of her daughter. The next day, in answer to his questions, she told him that everything had been done exactly as directed. He knew that if all had been done as ordered the patient would have no more trouble. Five days later he was surprised to find conditions puzzling, and shortly thereafter the patient was unconscious, and rapidly approaching the brink of

the river. Then he learned, when it was almost too late, that the motherly soul, who had buried many children, laughed at his directions, saying that such precautions were unnecessary. "They never do so in Ireland." No? Look at the death rate there! Especially note the high mortality from tuberculosis among the Irish school children!

It may be that many persons may not appreciate the remark of this good motherly Irish woman—"They never do so in Ireland." One of the frequently repeated objections to all new efforts in the line of saving life and health and particularly with regard to school inspection, is that such things are unnecessary. "They never used to do so in my day, and I am here all right." Yes, but how many have fallen by the way?

In an address before the Medical Society of Kings County in February, 1915, Honorable George McAneny, President of the Board of Aldermen, of the city of New York, gave some interesting data relative to the results of health protection, from which we take the following:

In 1866, the city had a death rate of 35 per thousand; in 1914, it was 13.3, and still reducing.

In 1868-1877, there were 154 deaths each year from diphtheria to 100,000 of population; in 1913 the rate was 32, a reduction of 80 per cent. The figures for scarlet fever were 91 per 100,000 in the period 1868-77; in 1908-1912 only 18, also 80 per cent. reduction.

There are, in proportion to the population, 700,000 fewer serious cases of illness in the city, than there would have been according to the annual rate of 1880.

It is not for a moment implied that this difference is due to the medical inspection of schools which is now practised, though that is materially helping. The reduction in mortality and morbidity may be justly attributed to the things which "they did not do in my time," but are done now.

In 1890, according to Burks,[8] San Antonio established a so-called system of medical inspection of schools. Two years later in New

[8] *Health and the School*, p. 128.

York City Doctor Moreau Morse was appointed Medical Inspector of Schools—probably the first such appointment in the United States. This appointment was made under the direction of the department of health. The first regular system of medical inspection of schools seems to have been established by the health department of Boston, Massachusetts, in 1894. Since that time the idea has spread, until in 1913 it was estimated that more than 800 cities had established similar inspection. Several states have passed laws requiring such inspection; others are permissive only. In many instances the system has been inaugurated without special authorization in law, but under general provisions. In some jurisdictions the system has been under the control of the health department; in others it has been wholly under the supervision of the educational boards. In several the examination has been begun and continued by the medical society. In a few cases it has been maintained partially or entirely by private volunteers, or by such organizations as Women's Clubs. In glancing

through a list of Gulick's "Medical Inspection of Schools" one notices that only a minority in 1908 were under the care of educational boards.

"What is worth doing at all is worth doing well," and "the laborer is worthy of his hire." While voluntary inspection of schools might sometimes be started by non-governmental bodies, or by individuals, there are several objections to such work, except in very temporary experiments. It may occasionally be best to make such an examination to settle some special question, or to demonstrate to the community the results which may be attained by such examinations regularly made. On the other hand, parents and others are suspicious of the prying impertinence of such volunteers. Strong objection is frequently made, and the suspicion has sometimes been apparently justified that such examinations have been made the "feeders" for the private practise of the examiner or his friend. Besides this, such gratuitous service often breeds a sort of lessened respect for the entire profession to which he belongs. What business is it of Doctor A.

if one of the regular patients of Doctor B. has adenoids? Why should the members of the Woman's Club be so inquisitive relative to the physical condition of Dennis McSweeney's or Sambo Brown's children? That is the way the victims feel, and it makes no difference how disinterested the examiners, or their sponsors, may be.

Neither should the examinations be made by the department of health. Their training and manner of thought would come far from fulfilling all the important points. This seems to be the almost universal opinion of disinterested students of the subject, in spite of the proportion of places in this country where the health department does control the matter. It takes a person of peculiar nature and education to be a good medical examiner of schools. It is better if he be fitted also by experience as a teacher. Professor Dresslar of the National Bureau of Education thus sums up the necessities of his qualifications.[4]

"The school physician must be an expert

[4] *School Hygiene*, p. 331.

diagnostician, for his work is to detect disease, not to treat it. He should be a man of refinement, culture and tact, that he may win the confidence of the children who shall come to him to look upon him as a friend. He must know how to exercise firmness in dealing with parents who do not understand the necessity, or appreciate the value, of his work. He must have a psychological, as well as physiological and anatomical, knowledge of children. He must be a man of patience, a man who is deeply conscious of his mission—the correction of defects, the prevention of illness, and the alleviation of suffering, thus adding to the sum total of the world's peace and happiness."

Dresslar, who is not a physician, but who has had an unusual opportunity for studying the problems connected with the medical inspection of schools, gives it as his opinion that "there should be no connection with the Board of Health, except that the medical inspectors would report contagious diseases to that board which by virtue of existing laws assumes control of such cases." Hoag and Gulick, who are physicians, are quite as emphatic as to the

inadvisability of having the work under the health office. Experience has demonstrated this fact, and where the work was begun by the health department it is now under the management of the board of education in a large percentage of the cases. Occasionally the expense and authority have been divided between the two offices.

It is not the province of the school physician to treat these cases, says Dresslar, and we are inclined to agree with him. For that very reason the examiner should not be in general practise. Even if he carefully recommends the family to consult the family physician, if the examiner be also engaged in practise there is almost a surety that friction will arise, and he will be unjustly suspected of using his position to build up a private practise. In fact, some physicians, generally of the commercial class, very frankly advise that young physicians be permitted to serve thus, practically without pay, and in lieu of other compensation that they be permitted to build up a private practise.

If they be not permitted to engage in general practise, it follows that they should be engaged and paid for full time. To accomplish this in some of the smaller districts it would be necessary that several districts unite to employ one good examiner, as is the custom in England. Sometimes the work of medical inspector might very properly be combined with teaching of sanitation, hygiene and physiology. The lessons in sanitation given to the child, illustrated in the daily work of the examiner, will go far toward changing the habits of the parents.

In addition to work directly connected with the infectious diseases, the examiner keeps track of the condition of the nose, throat, teeth, scalp, eyes, ears and finger-nails. Adenoids are very common. They not only cause deafness in many cases, but the mental operation is made more difficult and sluggish by their presence. Many children who are backward immediately change after the operation. In some parts, particularly through the South, it is necessary,

also to examine for intestinal parasites. This work, however, has been generally done by the ordinary health agencies, and as a separate undertaking. Special studies pertaining to school work are sometimes made. For example, Burgerstein quotes the studies made by Key of Stockholm upon the influence of outside work upon the amount of sickness.[5] He found that those who were required to do the most work outside of schools were those who were most likely to be sick. This extra work apparently referred chiefly to studies, such, for example, as music. Here in this country the relationship of play to study and health has been the subject of much investigation, and as a result the importance of play is now recognized as never before.

The importance of play brings up another use of the school physician. While the average scholar is benefited, not harmed, by vigorous exercises, it sometimes happens that a heart is overstrained, or other injury is done by exercise

[5] *School Hygiene*, p. 125.

beyond that which the child should attempt. Supervision of this element is an important duty.

In order to carry the hygienic instruction home when necessary, to keep track of the home surroundings, and to see that the parents fully appreciate the defect cards sent home by the examiner, many schools, and now an increasing number, employ a school nurse. Practically the nursing staff among the foreign element of a city like New York is a school extension department.

In many places there has also been established the school clinic, where those who are unable to pay for service may have the attention of physicians and dentists. Hoag is strong is his advocacy of the clinic, but there may be some question as to the advisability of its use as a routine matter. It is an institution which may be very easily abused, and it may arouse opposition where there would be none without it.

While school clinics may be found generally useful, they are especially to be advised in the

poorer sections of cities, where the parents, particularly foreign-born individuals who have grown up under unfavorable conditions, are prone to neglect the early stages of abnormalities among the children. The clinic has also proven especially advisable in connection with college life, where many young people, away from home surroundings and parental watchfulness, are exposed to many kinds of danger to health. Stimulated by an epidemic of typhoid fever among its students, the University of Wisconsin established a school clinic some years ago in order to keep a closer and more intelligent oversight of the health of its community. Students are encouraged to come to the clinic, where they may obtain the best of professional advice and instruction without cost to themselves. Here all students are examined at the time of matriculation, and record is made of conditions found and history. On the basis of this examination the students are divided into classes, and receive physical supervision, including advice as to work, in proportion to the defectiveness discovered. The necessity for

this supervision arises out of the educational work of the university, and the methods used have direct relationship to education in training and in result.

The medical inspection of schools has now proved its usefulness. It is often opposed through ignorance or prejudice. Its object is simply to enable the scholars to get the most out of their school experience, and to train them to efficient citizenship, and to prevent untimely deaths. The work should be recognized as educational.

Medical inspection of schools has been opposed by two principal organizations: the "League for Medical Freedom" and the Christian Scientists. The "League for Medical Freedom" is an organization which was formed apparently by the patent-medicine interests in order to defeat the Owen Bill, which aimed at the creation of a national Department of Health. It was thoroughly commercial in its nature, and untruthful in its arguments. Like its other statements this "League" was in error in affirming that this movement for medi-

cal examination of schools was an effort of "the medical trust" to get control. The real anxiety of the "League" apparently was because it feared that with healthy children, trained in the principles of hygienic living, there would be less demand for the services of commercial men calling themselves "doctors," or for patent medicines.

So far as the writer knows there has been no organized opposition by the Christian Scientist Church, but many individuals, acting upon mistaken notions, prejudiced perhaps by some incident not covered by the real movement, or instigated by some false statement originated by some interested person or organization like that just mentioned, have objected to this inspection; and in one case such persons have carried the legal contest to a supreme court. In the supreme court of Minnesota the authority of the schools to initiate medical inspection of schools, as a reasonable and proper part of their educational character was upheld in Stoltenberg v. Brown.[6] In South Dakota

[6] 112 Minn. 370, 128 N. W. 294.

a board of education provided that a scholar seeking admission must present a certificate of examination from a physician of their own choosing, and at the expense of the family, or by a physician furnished and paid by the school district. This was objected to as an interference with religious liberty, and as in conflict with the laws compelling school attendance. The court upheld the law, saying that it in no way interferes with religious liberty, and that no question of sect should enter into the work of the school. That physical culture, athletics and vocal culture are not required taught by statute does not make their provision invalid, since there is nothing in the statute prohibiting such additional instruction. On the same basis, medical inspection of schools, not being prohibited, and being properly a part of the educational work of the school is allowable. The examination does not exclude any person, unless he excludes himself, by failing to produce the certificate; or in case of a disease dangerous to the health of the other

scholars. The court therefore upheld the action of the board.[7]

The failure of a pupil to make the normal advance in his work increases the cost of education for the district. It is therefore a duty of the school management to investigate whether the failure be due to the teacher, the school surroundings, to the inherent capacity of the child, or to some environmental influence upon the child. It is therefore a reasonable part of its duty to investigate the child's habits out of school, and it has even been thought by many, and actually practised to some extent, that if evidence shows that the child is underfed, by reason of the negligence or poverty of the parents, the school should also provide meals. Surely some governmental body should have the authority to insure the proper nutrition for the growing child, who in the future will become a prop or a burden for society.

On the other hand, while the authority of a health department may be recognized over the

[7] Streich v. Board of Education, 147 N. W. 779.

subject of infectious diseases, and though further studies by that department might be tolerated by the community, it is very doubtful whether the courts would conclude that the department of health has the authority to delve into private affairs such as attendance at the "movies," amount of breakfast eaten before school, increase in height of child as compared with increase of chest circumference, and ocular or aural defects which lessen the child's ability to keep up in his classes. Such studies are essentially in line with the problems of school management, but are only distantly related to the work of preventing sickness. On fundamental legal principles, then, it seems that the medical inspection of schools might far better be left to the department of education.

Because this work is essentially a study which is of value in direct variation with the number of accurate observations, it should be uniform in character, and under the general supervision of the state department of education, with which the United States Bureau of Education would willingly coöperate. Japan

is collecting its data from the entire kingdom, and it is doing so because her leading men have decided that it is a necessity.

No false pride of a parent should stand in the way of his child's benefit. The object of the examination is to inculcate *health,* not disease. Every citizen should therefore assist in the work, insisting that it be done honestly by those whose nature and education fit them to do it in a scientific manner.

CHAPTER VIII

ORGANIZATION OF HEALTH DEPARTMENTS

ALTHOUGH Mr. Eaton, in his *Government of Municipalities*[1] gives a somewhat lengthy discussion to show that health administration should be in the hands of a *board* of health, he does not indicate great familiarity either with the legal or practical aspects of the problem, and his ground is quite the opposite to that taken by most recent students of governmental methods, and his arguments are even contradicted in his own book. It is true that, simply because that has been the American custom in the past, most laymen and physicians think that the board system should be continued. Since this matter is generally decided by persons who have not enjoyed the privilege of a careful training in the principles of governmental practise, it seems best to devote some space to the consideration of this subject.

[1] P. 407.

Mr. Eaton argues that where the authority resides in one man there is too great an opportunity for oppression and partiality in administration; and there is need for multiplicity of council to obtain the best results in formulating regulations and ordinances. On the contrary, to get the advantage of numbers in a board it must have some degree of legislative power. This it does not, and should not have. The rules passed by a board do not themselves bar any abuse of power by the executive or his agents. On the other hand, the more boards that are permitted even a modified legislative power, the less prominent will the deliberations of each become. Mr. Eaton himself says:[2] "In most American cities the ordinance making power is distributed between limited councils, boards and single officers. Much conflict, confusion, and needless litigation are the inevitable result, as there would be concerning the laws if there were several law-making bodies in the same state." This is of itself sufficient to condemn the suggestion

[2] Op. cit. p. 262.

that an administrative body should be a "board," in order to get the advantage of multiplicity of ideas, and a division of responsibility.

An illustration of needless and useless litigation because of apparent conflict between the ordinance of the city and a regulation made by a board of health is found in the case of People *ex rel.* Knoblauch v. Warden of City Prison.[3]

What is true of municipal government in this regard, is also true of state administration. President Goodnow says:[4] "The experience of the world is against the administrative arrangements of the states of the American Union;" and the English student, Percy Ashley, says of the American state governmental system:[5] "The state executives are ill organized and weak."

A prime essential for executive efficiency is found in the idea of oneness. Chief Justice Story has given the subject a somewhat lengthy consideration relative to national ad-

[3] 153 N. Y. Sup. 463.
[4] *Principles of Administrative Law*, p. 133.
[5] *Local and Central Government*, p. 327.

ministration in his work on the Constitution. He says:[6]

"That unity is conducive to energy will scarcely be disputed. Decision, activity, secrecy, and despatch will generally characterize the proceedings of one man in a much more eminent degree than the proceedings of a greater number; and in proportion as the number is increased, these qualities will be diminished." "This unity may be destroyed in two ways: First, by vesting the power in two or more magistrates of equal dignity; secondly, by vesting it ostensibly in one man, subject, however, in whole or in part, to the control and advice of the council."[7] Although discussions are beneficial in legislation, after a law has been enacted there is no longer occasion for discussion. It is only the duty of the executive to administer the law as enacted. "No favorable circumstances palliate or atone for the disadvantages of dissension in the executive department. The evils here are pure and un-

[6] Op. cit. sec. 1420.
[7] Sec. 1421.

mixed. They embarrass and weaken every plan to which they relate, from the first step to the final conclusion. They constantly counteract the most important ingredients in the executive character—vigor, expedition, and certainty of action."[8] "But the multiplication of voices in the business of the executive renders it difficult to fix the responsibility of either kind; for it is perpetually shifted from one to the other. It often becomes impossible, amidst mutual accusations, to determine upon whom the blame ought to rest."[9]

Mr. Justice Miller tells us:[10] "The nearer we approach to individual responsibility in the executive, the nearer will it come to perfecfection." President Goodnow sums up the argument, particularly as regards municipal administration, in the following words:[11] "The desirability of single-headed departments has come to be regarded as unquestionable, and it

[8] Sec. 1424.
[9] Sec. 1425.
[10] *Lectures on the Constitution*, p. 94.
[11] *Municipal Government*, p. 225.

is almost heretical at the present time to express the conviction that the board form is preferable."

All that we have heretofore said in support of the single-headed executive rather than the board is of general application; but when it comes to a matter requiring a special, or technical, education and training, as in health administration, the case is much stronger. This is especially true when the department has the supervision of so important a matter as the health, and so prosperity of the community. In the earlier times, when the science of health protection was in such a crude and chaotic state, it was not possible to have such enactments as may now guide administration. The science was indefinite, and the application was individual. There might then have been some justification for a board of health. No one was competent to be an executive of health, and the members of a board were equally incompetent from a scientific point of view. This is no longer true. It is true that competent

executives of health are uncommon, but they will be more common when the country fully recognizes the facts.

John Stuart Mill was wise when he said:[12] "No progress at all can be made toward obtaining a skilled democracy, unless the democracy are willing that the work which requires skill should be done by those who possess it."

It is manifestly impossible to appoint a board of sanitarians of equal ability; yet the members have equal authority and equal irresponsibility. The strength of a chain is measured by that of its weakest link. Every member of a board below the best man for this special work, no matter how competent he may be in other lines of professional or business activity, is so much dead weight upon the administration. His presence may be positively antagonistic to good work, on account of his lack of special education and experience. It is an almost universal rule that the ignorant man does not appreciate the depth of his ignorance, but overrates his ability. He may

[12] *Representative Government*, Everyman's Ed., p. 248.

even help to force the board into some *ultra vires* tort, for which the competent man who has been overruled will be held legally equally liable.

Whereas, in Prussia and in France the professional administrator is only subject to the general and financial control, in England "The unprofessional administrators are supreme; they are the authorities, and the salaried experts are merely their agents and servants."[18] Still, in practise the English health specialists have more power and influence in shaping administrative measures than have similar officers in the United States. The English official class are better posted upon the necessities of good government, whereas in the United States they are more proficient in "politics."

The services of a competent specialist should not be expected unless he be paid a reasonable compensation; that means, a compensation commensurate with the responsibilities of the position, and with the time and expense requisite for obtaining his fitness. The first point is

[18] Ashley, *Local and Cent. Gov.*, p. 13.

generally recognized in America, and the politician class take advantage of it to secure for themselves the best paying berths, without regard to qualifications. It thus frequently happens in American administration that the really competent, or less incompetent, health official is made subordinate to the mere political appointee. The first question to be asked relative to the fitness of a candidate for appointment to a health department should be, not is he a good physician, nor does he belong to the party in power, nor is he a getter of votes, nor does he have elective influence; but, does he know the modern science of public health protection.

It is a very unfortunate thing that the medical profession should so frequently imagine that any competent bacteriologist is also a competent public health administrator. The contrary may be the fact. The expert laboratory specialist frequently takes too narrow a view of his position. The administrator in a large office has no time for laboratory work himself;

and to no small degree the same is true of smaller offices. It is necessary that the executive head should have a good knowledge of the methods and results of bacteriologic investigation, just as he should know the general facts of sanitary engineering; but a thorough acquaintance with the subject of administrative law is more important for the chief than either engineering or bacteriology.

There is also a tendency in American governmental practise unduly to multiply executive bodies. The result is necessarily conflict of authority, division of responsibility, and unsatisfactory and expensive administration. With every new suggestion as to subject, some amateur enthusiast rushes forward to have a new commission appointed to make the investigation, or to attend to its administration. Sometimes this work is arranged by regular governmental agencies, as when the legislature establishes a commission to investigate the industrial diseases. Sometimes voluntary organizations are formed actually to do the work.

The formation of antituberculosis societies is of itself a demonstration of the utter inefficiency of the ordinary health departments.

Many of these commissions are expected to work without pay. A competent member of the Illinois commission for the investigation of industrial diseases was forced to resign from the commission in order that she might receive a salary while actually doing the work. Of what possible advantage can a board of non-experts be, who devote only a portion of their time to an investigation, and who must judge of the matter at second-hand? Why should such intermediaries interfere between the expert, or trained observer, and the people? What man would expect to place the trained manager of his factory under the control and dictation of a committee who are without the same degree of training?

Definiteness of duty, and therefore a like definiteness of responsibility, are essential elements in the work of a good and efficient executive. This individualness of responsibility practically means that the chief should have

the appointing power over all his subordinates. This further means that he should have the power to remove such officers as he can appoint. Incidentally, we may here remark that though the principle of civil service is undoubtedly correct, in its practical operation it may often protect inefficiency. A man may pass a good general examination, and still not be efficient, and when he chances to begin his service under a general officer who is himself inefficient the subordinate becomes rooted in his place. So long as he commits no definite breach of law or rules, it is practically impossible to oust him. On the other hand, the position as health official should be absolutely removed from politics, and a competent executive should be retained as long as possible.

According to the laws of some states a candidate is not eligible for appointment to office unless he shall have been a resident of the jurisdiction for a year previous to his appointment. Though such a law may be advisable relative to elective offices, and though it may also be desirable relative to positions which do

not require special or technical education and training, it is a positive and serious handicap to efficiency in public health service. There is no advantage in such a law, except to the incompetent office-seeker. It is a disadvantage to the community, for many times it is impossible to find a competent official in the jurisdiction. It is a disadvantage to the competent man, for it practically prevents his rising higher than he starts.

Were there no limitation in appointment of health officers as to previous residence, it would be quite possible for the young man to start as an inspector in a metropolitan department. Having gained experience he might be either directly appointed as the head official in a small city, or he might be so appointed after taking another course in the school. In the small health department he would gain another point of view, and other training. There would be a strong incentive for him to do good and efficient work in the hope that he might thus gain a promotion to a larger position. The community would gain in that it first would

have the benefit of his previous training; and secondly, through his increased efficiency as a result of his ambitions. On the other hand, the larger community would not run the risk of appointing an untried and inexperienced administrator. The present law, requiring a year's previous residence before appointment, is an injustice to all concerned, and should be immediately so changed as to make an exception in the case of such positions as require a special or technical education and training. This point is the more important in the case of health officials inasmuch as the education needed is one for which there is practically no demand outside of governmental service.

The head of a health department should be a whole-time paid officer, thoroughly trained in the duties of his office. Such a man is worth to the community all that he is paid. It will often be found impossible for a small village to pay such an officer. That should not mean that the village should get part-time service from some doctor in private practise; nor that it should entrust its affairs to a board of phy-

sicians who divide between themselves the responsibility. The following incident from the writer's personal observation will show the inadvisable result of such action.

In a little city in the eastern part of Illinois there was a board of health composed of three of the leading physicians. They were men who were as much alive to their responsibilities of office as one is likely to find. An epidemic of typhoid fever occurred. Investigation showed that a young man had come home to his mother's farm from an Indiana city and developed typhoid fever. His mother was a widow, dependent for her support upon the conduct of a small milk trade. The expense of the boy's sickness made it all the more necessary that she keep her trade. She also felt obliged to economize by doing as much of the work as possible, caring for her boy in the meantime. The attending physician was one of the board of health. He tried to watch over the possibility of the spread of disease, but being employed by the family he did not feel that he should take the first steps toward a

more vigorous quarantine. On the other hand, the other two members hesitated to act because they knew that friends of the widow would charge that they were actuated by jealousy, because they had not been employed. They accordingly kept quiet, and waited. In the meantime case after case developed, and every one was among the patrons of the widow milk dealer. At last, stirred by the alarm of the citizens, they insisted upon the quarantine and the epidemic was stopped.

In the county where the above incident occurred there were several small villages, in addition to the county seat, which was the city mentioned. No one of these communities was itself able to employ a whole-time health official. On the other hand, the county would have saved money for its citizens had it appointed a health officer and an assistant, and those two could have administered the affairs of the entire county very satisfactorily. Together they could have shared the labors of microscopic examinations, and other laboratory work, have kept the records, and attended to such inspec-

tions and other routine work as seemed advisable. There was no necessity for either of them to go outside of their legal jurisdiction, as there might be where the milk supply, for example, comes from outside territory. It would probably be inadvisable for such an office to make many analyses of foods, such as may be more frequently needed in the vicinity of a large city. On the other hand, in such an office, when it had been working for a reasonable time, there should be on file data relative to every well or other source of water supply in the county, data as to sewage and garbage disposal, data as to the number and character of animals on every farm in the county, population of each district, location of each school, and telephone connections over the county, so that by reference to the map the officer could tell at a glance where to call up by telephone some person to give information relative to conditions. State departments might well coöperate with such a county office, making water analysis, and furnishing temporary service of special inspectors. This office should receive

all reports as to infectious diseases, and records of births and deaths. It should also keep track of cases of infectious diseases in domestic animals.

Veterinarians are ordinarily appointed by the state. There should be a veterinarian in the vicinity, and such a man would probably find it to his decided advantage to coöperate with such a county health office. It would be equally helpful to the health office to make such an arrangement. In some more thinly populated sections it might even be advisable to make the veterinarian the assistant in the health office.

In connection with the public health school of Harvard, and the United States Public Health Service, Professor Phelps some time ago tried an experiment in a more thickly populated portion of Massachusetts, in which several villages were united into one health department. This worked very satisfactorily, and enabled the employment of several persons, each for some specific portion of the work, and all done under Professor Phelps' direction. A similar

plan has given satisfaction at La Salle, Illinois. To overcome legal objections in such a case it might be necessary that A be appointed the health officer of M, B of N, C of O, and so on, with the understanding that they are to work together, and pool the issues. Thus, under such an arrangement A would make the laboratory tests for N and O, as well as M; B would make inspections of dairies, etc., in M and O; and C would keep the records for all the villages.

The head of the department should be a whole-time officer, but his assistants need not be such. It is far better to have the entire time of one good man in a given line, ordinarily, than to have half time from two or three in the same line of work. This is especially true of physicians. As has been said before, a physician who spends part of his time in general or special practise is morally certain to bring upon the department, sooner or later, suspicions of intrigue. On the other hand, there is often a decided advantage in employing part of the time of a competent bacteriologist or inspector.

In a small office such a part-time assistant may easily do all that is desired in that line. He may be engaged also in teaching in the local high school or college. By such an arrangement both the high school and the health department may be able to obtain the services of a better man than they would otherwise feel able to pay. Students might be employed for inspection work, especially those who are studying in health schools. That which especially lends itself to this form of service is that while the inspection work is the most urgent in the summer-time, when the school is not in session, the heavy work of the school occurs in that portion of the year when ordinarily the work of a health department should be the lightest. Further, such practical work gives point to the work in the school, and enables the student to grasp the fundamentals as he would not otherwise be able to do. Not only so, but the student inspector brings to the small health office the latest ideas from the school, and the returning student inspectors naturally compare the conditions and results in the different ter-

ritories in which they have been working. Students thus recently made a most thorough sanitary survey of Logansport and Noblesville in Indiana.

One of the natural results of such arrangements would be that certain health departments would acquire a certain accredited standing, so that service there would be recognized in the school work; just as certain hospitals have received accredited standings among medical schools.

In the metropolitan health departments the organization must be much more complex. In addition to the commissioner and his assistant, there must be many heads of sections, as of laboratory, statistics, infectious diseases, tenement inspection, garbage disposal, etc. Perhaps under each section head there may be several subheads, and under them the individual inspectors or other workers. Each inspector should have a definite territory for which he is responsible to his subchief. In that way responsibility may be at once traced in either direction. The responsibility is determined by subject between

sections, and by location to the responsible individual. Sometimes a subject may involve two or more sections, in which each must be held responsible. For example, though it may be the duty of one man to look after the disposal of manure, and of another to inspect dairies, as a part of his work relating to dairies the second should also inspect the barn, and if he finds that the manure there is breeding flies he should at once report to his chief, who will communicate the complaint to the chief in charge of manure disposal.

Such an organization also provides for appeal. There should always be some opportunity for appeal, and if the department has made suitable provisions therefor, appeal outside of the department to the courts could only cover a question of law. Decisions within a properly organized executive department are not subject to review by the courts. When, however, there is question as to whether the legal forms have been complied with, there is appeal to the courts. If it shall appear that the officer has exceeded his authority, and injury has re-

sulted therefrom, the courts will hold the individual officer legally responsible. The law does not presume that its servants will act illegally, and if the officer does so, though he may have the office claimed, yet in the special act in which he does the wrong he will be presumed to be a private wrongdoer. When, however, in a matter in which the law gives him discretion, he makes an error in that discretionary decision, he will not ordinarily be held liable for injury resulting from his act.

All of these things show the necessity for appeal within the department, and for a knowledge of the law which may guide the department head.

The work of a department of health is at the best uncertain and irregular. If the office be manned only for the ordinary amount of service, there will be times when it is unable to cope with the problems promptly. Slack time may be used for routine work and completing studies of special subjects, but it is desirable that some means be found for greatly increasing the force at command on short notice. This

additional force may only be needed for a week or two, or it may be occupied for some months. There are two solutions of this problem. The arrangement previously suggested between the department and a neighboring school where inspectors may spend part of their time is one. Another may be found in the relationship between the local and state departments. This will be mentioned later. Sometimes the stress may be relieved by transferring some of the force temporarily from one section to another. There is this advantage in such a makeshift, that thus a worker becomes more familiar with the methods of other sections, and also gains a broader view of his own work.

The guardianship of public health is no longer merely a local matter, largely individual in its decisions. There is need for the highest technical education in many lines, and different sections of the country and varying lines of enterprise are most closely concerned in the health administration. Take, for example, the milk industry. The supply of a city like Washington, New York, Boston, Chicago, St. Louis or

Philadelphia, is received from several states. Even when a metropolitan supply is received only from the one state in which the city is located, it comes from several counties, often widely separated. It is impossible to tell from examination whether or not a certain sample of milk is safe in most cases. Examinations take time, and serious harm might easily result before the conditions may be discovered, even when the tests finally show that there is a dangerous infection. It is not to be presumed that milk will be actually spoiled when it is delivered to the customer. If it were, the customer would seriously object, and the dealer would soon lose his patron if the incident were frequently repeated. On the other hand, if the conduct of the farm be sanitary the milk will be safe, and the chemical and bacteriological examinations of the supply need not be so frequent, nor so searching, but the results of the service will be far more effective. But inspection of farms widely separated takes much time, and the city inspector has no legal authority to order immediate changes made when he finds

dangerous conditions. It is true that he may withhold the privileges of trade with his own city; but then the farmer will often ship his product to some other market, or will find another route by which the infected milk may reach the same market. A certain company had bottling plants in different counties. That from county X went to A, while from Y it went partially to B and C. The X territory was found infected with a communicable disease which was epidemic in A, and which in A seemed to be very strictly limited to the patrons of this one dairy. Milk from X was refused admission to A, and in its place came a carload from Y. The officer at B knew that his supply had been coming from Y, so that when he discovered a sudden outbreak of the disease in his city he at once hastened to Y for an inspection. A and B were on quite different lines of rail, so that he never suspected the fact, but it was a fact nevertheless, that the infected carload from X had been taking the place of his better supply from Y. In another instance, when typhoid was found at the farm

of a producer, and many cases of infection had been traced to that one supply, the milk from that farm was refused in market D. Shortly thereafter, in tracing another outbreak of the typhoid it was found that this farmer had simply driven to a station on another road, and, using another name, had been shipping to another dealer. In the first instance, lack of authority over conditions had simply shifted the injury from A to B. In the second it had occasioned doing the same work twice by the D health department.

The foregoing incidents illustrate the diversity of territory interested in a single proposition. The same trade shows how a problem may need the study of the veterinarian, the chemist, the bacteriologist, the epidemiologist, the general inspector of dairies and other specialists. Further, when milk is refused in the milk trade it may be diverted to the creamery for butter production, or for the making of cheese.

Bruck, in Germany, found that butter may retain typhoid bacilli for twenty-seven days,

and Washburn, as quoted in the government bulletin on *Milk and Its Relations to Public Health,* found that butter may retain the living typhoid bacteria as long as sixty days or more. While in the course of the repeated washings most of the bacteria would be removed, still here is one possible source of infection. Milk makes a very satisfactory medium in which the typhoid bacillus multiplies. The buttermilk is not washed, nor otherwise mechanically purified, so that if the milk was originally infected the buttermilk will retain the infection for a time at least. The time required for the ripening of cheese makes it unlikely that it would retain this infection. Rosenau says,[14] "Nevertheless fresh cheese, such as cottage cheese, may contain the infection." He does not say that the infection has been found in such cheese, and the writer knows of no such evidence.

Ice-cream may also be an active carrier of typhoid infection. Both butter and cheese have been found to contain living tubercle bacilli.

[14] *The Milk Question,* p. 114.

In a series of tests made by Schroeder he found infection with tubercle bacilli in a majority of the butter samples examined. Mohler, of the Department of Agriculture, found viable tubercle bacilli in butter after one hundred and fifty-three days. Cheese infection with the tubercle bacillus is less frequent because of the longer time required in ripening, but such infection has been found.

Since dairy products such as butter and cheese lend themselves to wide distribution, and they may be transporters of infectious germs, it follows that it is important for the resident of Providence, R. I., or of Washington, of Philadelphia or New York, that the manufacture of milk products be carefully supervised by health agencies even in the little country village of Wisconsin, or Iowa.

Efficiency of health administration then means that so far as it may be possible all the different agencies for the safeguarding of the public health should be systematized and organized. It means that the organization be of such a nature that it will be possible without

delay to get definite information relative to the various health questions which may be asked, from any section of the country. This necessity may be partially recognized in the following incident. There was a sudden outbreak of typhoid fever in an Illinois city. The only common point between the cases, as far as could be determined, was that each patient had eaten celery which had been purchased by the local grocers from a commission firm in Chicago. Thence it was traced to a Michigan town, but the Illinois official was informed that there was no typhoid there. However, he learned later that there were cases and deaths from typhoid fever on the celery marshes of that town. The local health official was apparently afraid that a statement of the truth might interfere with an important branch of the town's industry; and he regarded the matter as of no one else's business. Perhaps a few damage cases in such conditions would open the eyes of the official and his friends, and thus serve to safeguard the public weal.

Of all the branches of governmental activity,

the health department is the one which most needs to be executed without fear or favor. The practising physician is incapacitated from such service because of his interest in his patrons' families. The member of the little city board, who did not want to be too strict with the widow who sold typhoid fever in milk, knew that with more strict quarantine he would be obliged to wait for a long time for pay for his professional services. The health officer of the Michigan town probably had patrons on the celery marshes, so that he did not want to hurt the business.

Legally speaking, a municipality has a dual character. In so far as its affairs are strictly communal within its limits, as in the maintenance of a public water supply, or in the granting of a local franchise to a gas company, it is a local corporation, and entitled to do as it pleases within certain general restrictions. In other matters it is simply the local guardian of strictly governmental affairs, to which the state has assigned certain governmental duties as the representative of the state.

The work of a health department is essentially state duty, and in that sense a health officer is a state officer. That fact protects him in the performance of his duty. A city may be sued for its conduct of the water business, but a suit against a city for its work in the preservation of the public health would not stand in court. This has been the repeated decision of the courts in all parts of the country. A state can not be sued in tort, and this protects also its subordinate agents. So, unless an officer exceed his lawful authority, he will be protected from being assessed damages, even though as a result of his error some individual suffer injury. This is not true relative to the officer who is essentially an officer of the corporation. These matters have been the subject of legal decisions in the past.

If the officer be essentially a state officer, even though he be appointed and paid by the city, he is also subject to state regulation in the conduct of his office. It has been held that police officers of cities may be appointed under the state regulations. Health officers are es-

sentially police officers, and under this general authority of the state according to the present law in the state of New York, if a local governing body neglect to appoint a health officer, the state department may make such appointment. If the state may make such appointments at one time it may do so at another. It has the power, therefore, to make such local appointments at all times, and the duty to provide suitable compensation may be assessed upon the local jurisdiction. There may be some question as to the advisability of always making such appointments by state officers, especially until the state has shown an appreciation of the necessities of the case by selecting trained specialists, rather than politicians. Still the legal right should be recognized, and in case of a real state department of health, with a makeshift local office, the right of the state should be exercised.

Whether appointed by the state or by the local governing body, the local health department should be recognized as a part of the machinery of the state, and there should be a

general supervision exercised by the state executive, and the local office must recognize its duty, not only to the local interests, but quite as much to the community as a whole. As to authority in health matters each state is the unit, and the nation must work at present almost entirely in an advisory capacity. It must depend upon the coöperation of the different states. In the states there is not only the moral force which produces coöperation between different districts, but there is the absolute authority of the state to compel such coöperation. In other words, a local health officer has no special obligations to the residents of his district, but he has a responsibility for the proper care of the territory, and that responsibility is to the people of the entire commonwealth.

This responsibility of the health officer to the entire commonwealth, and not to the people of his special jurisdiction, is another reason why there should be the greatest freedom of choice, and that officer should not necessarily be selected from the immediate neighborhood. In fact, it may very often happen that an offi-

cer from another jurisdiction may be more desirable for that very reason. He is less likely to be biased by personal interests, and he is more likely to appreciate defects. One who has always been accustomed to see certain things gets so used to the sight that he does not appreciate the defects as he would were he to visit the scene for the first time. In the same way, a man brought up in one community, or who has always lived in that one neighborhood during his active career, becomes hidebound in his brain. He does not readily get new ideas, and in consequence he falls far below his possibility in execution of his duty. Even to move him to a new location breaks his old manner of conduct, and enables him to make advances which he could not make at the old home. The gain to the community is still greater, for the man from away brings with him new ideas, and sees all the local problems from a new point of view. Custom is inertia which must be overcome. If the new ideas are mere notions he will find them difficult of application, though in another place the custom

has given them life. Thus the officer from away may have a test for his former methods and practises which would have been impossible in his former home.

To overcome some of these difficulties we might well copy some of the English customs. There the appointment of local officers of health is made by the boards of the jurisdictions, but the central authority, the Local Government Board, pays one-half of the salary of such a local officer under certain conditions. It requires that he shall not be engaged in private business, and that he be of a certain prescribed standing as to technical training. No officers of health partially supported by the Local Government Board may be appointed or removed without the approval of the central board. In some districts such local officers of health are also employed to make the school inspections, or to conduct the governmental laboratory for making chemical or bacterial examinations.

The commercial and transportational conditions of the present day demand that every inch

of territory in the United States be covered by some well organized health service. There should be some uniformity and definiteness of responsibility so that at any time, and with the least possible delay, information may be sent or obtained from distant sections. Some time ago the writer was seeking certain information from the different cities and villages of the state relative to a single public health problem. He found that in some localities there was no special health service; in others there were boards of health, composed mostly or entirely of unprofessional people, and without special training or education; in others there were boards consisting of physicians, and each referred the question to his brothers for solution; in some there was a commissioner of health, and he was not always educated in any professional line. It is only a few years ago since the great city of Chicago had for its commissoner of health a certain ward politician who was without any special training or education which fitted him for the place.

A medical book agent chanced one day to

meet a politician with whom he was well acquainted, and the following conversation is said to have occurred: "Why don't you apply for the position as executive of the state health department?" The book agent laughed at his friend's felicity, but on being convinced of his earnestness answered:

"I could not possibly get the recommendation of the medical profession."

"The governor wants to make a change, and you could easily get the place."

"I could not get the backing of the doctors, and if I tried they would jump on me and simply make me look ridiculous."

"Don't tell them a word about it. They don't count, at least before they begin to work, and after you are appointed they will say nothing. You go home and find J (naming a certain ward politician) and get him to take you to P (naming one of the political bosses), and get P to write a letter to the governor, asking for your appointment. Then come right back and I will take you to the governor."

The medical book agent did as he was bid,

and within less than forty-eight hours he received his commission as the health executive of the state. This incident is given simply to show that until the importance of the health positions is generally appreciated by the citizens they will be used, in many cases at least, as means whereby political favors can be repaid, or for personal aggrandizement.

All of the various agencies pertaining to the preservation of the public health in a state should be grouped under one appointive head. Appointive, for the people are not competent to select by election the most competent man for such a position. The more officers to be elected at an election the less discrimination will be used in casting the ballot. This has proved an almost universal rule. The people may select a good governor, and they should place upon him the duty of selecting his subordinates.

There is need in such a state department of health for the services of a state veterinarian and his assistants. They should compose one of the divisions of the general office of health,

and be neither a separate organization, nor, as at present in Illinois, subordinate to a commercial department of a state government. There should be also a division in charge of food inspection generally, and another to watch over the dairy business. There should be a division for the investigation of industrial conditions and diseases, and one for the investigation of lodging houses and tenement buildings. There must be a division of infectious diseases, in the charge of an epidemiologist with good training and executive ability. There must be a division of laboratories, which will be engaged in making the chemical and bacteriologic examinations. There should be a division of zoölogy, which should be prepared to make a survey of any section, and give needed advice for the eradication of pests which are injurious to health. In the southern states, at least, this will prove one of the most important divisions, and will be obliged to watch the production of mosquitoes and the hookworm particularly. There must be a division of vital statistics, which will keep accurate data relative to births

and deaths, and of the occurrence of infectious disease. Every local office should report to this division weekly as to the number of cases of infectious disease present, and in case of the appearance of an epidemic there should be a telegraphic report, so that at any time the state executive may be able to report as to the presence of such cases in any section of the state, with some degree of definite certainty. There should be a division of publication, and the reports and papers issued should be efficient means for the education of the people of the state. In many states it will be necessary to have a division on license, which will attend to the examinations for all licenses relating to health preservation, such as for physicians and surgeons, dentists, pharmacists, nurses, veterinarians, and perhaps barbers. The licenses should in each case be issued by the state commissioner of health, not by the examining board, and there should be a chance for rejected applicants to appeal within the department, making the decision of the commissioner final. There should also be a provision for the

trial of license holders, before a license can be revoked and withdrawn. There should also be a division of correspondence, and one of records. There should also be connected with the department a sanitary engineer. This position will be of increasing importance in the future, and it may prove to be one of the large divisions. This division should pass upon all plans for the change of systems of water supply or of sewerage. No sewer should be permitted to empty into any stream or lake used for water supply in any of its parts, unless the plans for such sewer shall have been approved by the sanitary engineer of the department, and upon suitable evidence that the sewage will have been so purified as to work no injury to other communities.

The above enumeration of the divisions of state departmental work is not exclusive, for in many jurisdictions other divisions may seem advisable. It will, however, give some slight indication of the magnitude and importance of the subject. Probably, too, it will be found necessary to have a division of subordinate ju-

risdictions, with a chief who will be directly responsible for the localized work. The state should be, as Pennsylvania is to-day, divided into sectional divisions, with a subchief for each section. With such an organization much unnecessary duplication of work will be avoided. In the place of having dairy inspectors from several cities to make the dairy inspections and records, this should all be done by the state department, and such definite records kept that any municipality may at once get its desired information.

Though at present the national government has only a limited authority, according to the legal interpretations of the past, the organization of a national Department of Health, with its head seated in the Cabinet, may be made on similar lines to that of the individual states.

In the practical working of such a department it will often be found that the same item of information touches several divisions. For example: The divisions having the oversight of local departments, epidemiology and dairies are each interested in the matter of infectious

disease prevalence. We have indicated that local officers should make those reports weekly, and sometimes by telegraph. Such reports would regularly find their way weekly to the division of publication, from the division of vital statistics, and proof-sheets could be distributed through the central office within a few minutes after copy is submitted to the printer. In case of an epidemic, the manifold copy could quickly be given to the divisions specially interested. If it be in a dairy district the chief of the division should have on file information as to the field supplied from the infected territory, and he could, and should, at once communicate the information to the subchief of the field service having that territory directly in charge. This does not mean that there should be instituted a quarantine upon this milk, but that the local officials may be upon their guard to detect the infection without delay. In other words, with such an organization it would be possible to anticipate and prevent serious trouble, with the least possible disturbance of the normal trade.

CHAPTER IX

PREPARATION OF OFFICERS

WITH the development of the modern science of public health there is coming naturally a readjustment of former conditions. Changes are being made in the conduct of commercial affairs, for definite and reasonable methods are taking the place of the former empiricism. Public health administration is becoming recognized as the aid and defender of commerce, not as its occasional enemy. Old principles of law find new and broader application. While the work of the practising physician is being greatly decreased, that of the veterinarian is being widened and dignified. The blacksmith or livery stable loafer, each of whom formerly was frequently consulted about equine ailments, have lost their prestige, and in the place of the old "hoss-doctor" we now find a profession whose education is far in advance even of

the average medical graduate of a few years ago. This point is important from the public health standpoint, for the veterinarians, as such, play a very influential part in the safeguarding of the community health—quite as much as that taken by physicians. Entomology, which only a few years ago was simply the pastime of boys, and the occupation of a few professors, has become a profession in itself, and a most interesting and fascinating one it is.

The great change has been the opening of a vast field of governmental work, much of which is entirely new in character, and for which no previous arrangements were made. It has been like the explosion of a shell. As a group of boys stand around while one of their number lights the fuse attached to an immense firecracker, risking their lives in their enthusiasm, and then run aside to see the effect of their act, so we may imagine Ross, Kitasato, Reed, Carter, Gorgas and the others, though widely separated upon the globe, mentally surrounding the little light showing in the fuse of the

idea—disease carriers. This idea is the key to modern sanitary science.

One result of the suddenness of the scientific change has been that an enormous work has been abruptly thrust upon the service, without competent workers. Incompetence and ignorance on the part of the field force must necessarily result in unsatisfactory work. It is therefore of importance to the people of the nation that provision be made to remedy the present deficiency. How can it be accomplished?

When college authorities have been approached with the suggestion that even the elements of the science of public health be taught in their institutions, they have generally replied that they have no funds at disposal for such work, and that there is no demand on the part of students for such courses. As to the students' demands, they are not likely to ask for courses radically different from those which have previously been given at the institution. Neither will they be insistent for the education until they see a future career behind it. The first point then must be to make it evident to

the student that the field offers him a career in exact ratio to his degree of preparation.

One of the tried governmental methods for fostering prosperity has been the favoring of infant industries. Germany and the United States have enabled manufacturing enterprises to get on their feet by means of a protective tariff. Communities foster new endeavors by furnishing capital, or by temporarily granting special privileges. In the same way a course in public health could be made attractive by the conferring of a degree, say of Bachelor of Science in Public Health, upon the completion of a curriculum practically equivalent to the ordinary bachelor's study. Give the Master's degree for additional study. Give, as is now being done in some institutions, the Doctor's degree for still more advanced study. For the present, at least, it would also seem advisable to give credit for work done *in absentia*. By law it might be well to require, not the degree, but an education equivalent to the degree of B. S. in P. H., or Master, or Doctor, for respective grades of health appointments. If

so, it would also be necessary to provide some examining board to determine this fitness.

Such courses could not be well given in many institutions. The variety of subjects is so great, and it touches so many schools of the university, that few educational plants could undertake such instruction without a heavy expense. This is particularly true relative to the advanced grades of work. Such advanced grades must have access to schools of agriculture, of engineering, of veterinary medicine and of law, quite as much as to schools of medicine and to hospitals. It is probably true that if the preliminary work were started in some schools an opportunity would soon be found for extension into the higher grades. It may not always be necessary that there be a school of veterinary medicine in connection with the institution. Special courses by competent veterinarians could be arranged. The same is true of other branches; but for the most perfect results the students must be brought in close contact with the best of work in the special fields.

It is the opinion of many that at least the

rudiments of public health should be taught in every college of literature and arts, and in every normal school, as a portion of the regular courses.

Unfortunately, a serious obstacle for the college in such endeavors is found in the question of finance. There is to-day no other "infant industry" in educational lines which is nearly so worthy of endowment as public health. The courses given to-day, even at the best of schools, are admittedly very far below the real necessities of the case. Perhaps a mistake has been made in beginning to build the structure at the top. There are several schools offering the degree of Doctor of Public Health, but so far as the writer knows, there is no institution which has arranged courses leading to lower degrees in the same service. There are, it is true, courses arranged for certificates, or for Master of Science in Public Health, but so far as the writer knows it is prerequisite in each that the recipient be already a holder of the degree in Medicine. There seems to be no provision for the education of those who are

to search for the breeding places of flies and mosquitoes, or as to sanitary conditions in the milk industry. It is quite as necessary to have trained inspectors as it is to have trained directors. In only one line has there been a previous recognition of the special nature of problems, and sanitary engineering has taken its position as a distinct profession. The present imperfection of course is due partially to the fact that courses are at best tentative. The subject is so new that there is as yet no general agreement as to what is most to be desired. Secondly, the courses must be managed largely as an avocation, rather than as the special vocation, of the teachers. This is due to lack of special endowment for such instruction, and in consequence the professor must steal from his endowed work in order to devote attention to that which is much the more necessary.

Is it not possible that our educational institutions are too much impregnated with commercialism? There has been a claim in the past that learning unfitted the student for business, and now special courses are prepared for the

commercial student. However, recognizing fully the unpopularity of the statement, the writer can not resist the temptation to enter a hearty protest against the commercializing of education in the way that is being done to-day. Science and literature, while they have their practical value, have a sphere in themselves, and independent of the present commercial utility. Studies which a few years ago were of minor importance are to-day exceedingly useful. Consider, for example, the great importance to-day of the study of the life habits of insects. The tendency, then, toward the selection of courses of study purely for their present economic utility is commercial, rather than educational, unless the courses may have a high cultural value in themselves. Courses pertaining to public health have such cultural values in a marked degree, and their utility adds to the interest. For example: It is quite as interesting and educational to study the development and habits of a mosquito as it is to study the structure of the bird's lung, and the results are to-day more applicable to daily life.

One of the most interesting passages in Gorgas' *Sanitation in Panama* is that in which he tells how he was called from his home one morning in Cuba at four o'clock, and hastened to the hospital, because a mosquito had her wing caught in the mesh covering the jar in which "her ladyship" resided. They had previously sent to the United States to get an oil stove with which to keep "her ladyship" comfortable. When Gorgas reached the hospital he found that Doctors Juan Guiteras and Ross had also been summoned from the city, and doctors and nurses from the hospital were working over the patient. She had been released from the gauze, but she was so exhausted that she lay upon a bed of cotton. The oil stove was started. A number of the most important physicians from Havana dropped in and sat mournfully around the room, making occasional suggestions to the staff. Surrounded by more professional talent than any but a few human beings, and after five hours of effort at reviving her, "her ladyship" finally gave an expiring feeble kick and was still. That mos-

quito was the only known living insect infected with the yellow-fever germ which was being studied and upon which depended the work of the next few months. The results had a tremendous commercial influence; but commercial motives had little to do with the enthusiasm of the scientists. Carroll and Lazear gave their lives in that investigation. Is it not "up to" the commercial interests of the United States richly to endow a few chairs for teaching public health in our universities, dedicating them to the memory of that board of army surgeons who put the world under such a debt by their discoveries?

It is not necessary to discuss here what should be the subjects taught, nor how much of time should be devoted to each study. We only suggest that the studies would be given a practical turn, and would be of greater benefit to the community and to the student, if they be associated with regular work under experienced health officials. In that way the community would the more quickly reap the benefit of the college work, and the college would be able

sooner to get its orientation relative to the new field. At present the courses are so long as to be discouraging. That is, a physician who has devoted some attention to this line of work finds that he must give up his practise and devote two years of study before he can get academic recognition for anything.

The present condition of the work requires that the laboratory and other school facilities shall be used during the winter by the regular students. Post-graduate courses in medicine may conveniently be given during the summer months, when the physician's practise is light and when the laboratories are not crowded. The summer-time is a busy one in health administration, though infectious diseases may be more common during the winter months. Many health officers would like to take short special courses from time to time, during their winter vacations especially. While track may be kept of such work, and after some years sufficient credit be thus accumulated for a degree, in most cases such special work would have no such object in view. This occasional

month in school would enable the officer to keep up with scientific advances, and occasionally work out some special problem. It seems also that there should be a concerted effort intended to stimulate original study outside of school, giving credits and honors for work especially meritorious.

There is another educational need for the men in the field that is already being met in some jurisdictions. All of the workers in small districts, and the leading men from larger areas, should have frequent meetings under the guidance of their leader. At these meetings local problems should be thrashed out, and every member expected to contribute some original study in connection with the work.

Until more satisfactory conditions arise, have not our state universities a moral obligation regularly and systematically to aid in the work of educating our guardians of health? How can it be done? Not by offering special courses for the summer months. That is the busy time for health officers. It seems perfectly feasible, however, to establish for each year a special

course of one week, and invite all who wish to attend. The course should not be the same each year. During that one week the special school could listen to two or three lectures a day, and receive laboratory training, especially in entomology. The regular faculty should be willing thus to contribute, and sometimes some special lecturer might be secured from the outside. Regular college students should have access to these lectures, and the results should be beneficial both to the university and to the special students. A very moderate fee might be required, and courses of study might be prepared for work at home, granting certain credits to those who later passed a test examination upon the subjects. At the University of Illinois there is now regularly held a meeting of the state municipal league, composed especially of city officers. These meetings are recognized as beneficial to all who attend. There city governmental problems are discussed, for the same questions arise in many places. College professors contribute with lectures and demonstrations. For example: At the 1915 meeting

Professor Brooks gave a most instructive lecture upon street lighting, demonstrating his points with models or with regular appliances. So in a health officers' school the zoölogist could give a short course on insect pests, and the professor of dairying could give instruction in that branch, which would save the studious inspector months of uncertain groping after knowledge.

Another important educational aid may be found in the United States Public Health Service. While it would perhaps be too much to expect that service to be thrown open for the education of any who might wish to use its facilities, still it would be desirable if more of the better class of men took occasional advantage of the laboratory facilities and the instruction in that service. Such use of the service would tend more perfectly to coördinate the work in the different states and should give a more advanced view of the administrative problems than would be possible in college work.

At Harvard and at the University of Wisconsin at the present time the course in public health includes practical surveys in the field.

In neither is that work strictly governmental. In both it is solely under the control and guidance of the college authorities. The writer is inclined to think that this method is a mistake. The man who is recognized as a student may be considered as a meddling intruder by the people, while doing exactly the same work as an employee of the city or state he would be given respect and assistance. While such coördination between the school and governmental bodies might at times be difficult to maintain, still experience shows that it is possible. Students have been doing similar work while still under the guidance of the teacher. This is made easier when the head of the department is also upon the teaching force of the school. He may be only a lecturer, or he may be really the responsible head of the special school of public health. Such arrangements are particularly to be desired now while the schools are necessarily small and weak.

As a rule, little assistance can be reasonably expected from medical schools. They are neither equipped with laboratory facilities nor

with men fitted for this special line of instruction. The laboratory of the literary college much more closely meets many of the requirements. Medical men as a rule have no reasonable appreciation either of what the public health work is, nor of the means needed in its execution. Some of them are positively antagonistic, either from mistaken ideas as to the real facts, or from self-interest, though they may not openly show their opposition. They feel that the public health guardians are too freely invading private rights.

The degree of Doctor of Public Health should never be considered as an additional degree in medicine. The fact that a doctor of medicine later takes a course in a law school and there receives the degree of Bachelor of Laws does not make the second course and degree an addendum to those in medicine. The two are distinct, and must be so regarded.

There are two important movements within the medical circles which directly concern the people generally, though the people have not been consulted. The first pertains to medical

education. The field of medical science has become so great that it is becoming a practical impossibility in the ordinary medical course to give the student proficiency in all. In consequence it has been suggested that the course be so arranged as to give a general view of the whole subject, and that specialties be made major subjects, from which the student may select his special work. Another suggestion in the same line is that the specialties be only taught in post-graduate work extending over from one to two years; and that none be permitted to practise the specialty unless he has taken these additional years of study and training. The first part of the proposition is not objectionable, but time devoted to a study does not create competence. Many men, without the additional time in school, have become eminent in special lines of work. This is true of the very men who are to-day advocating that their work be capitalized by preventing competition unless the student shall have given up his practise and spent further time in the medical school.

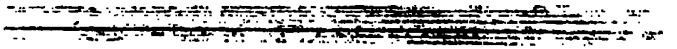
The second movement is concerned in the formation of a new society, or "College," to which certain members of the profession may be elected after passing a satisfactory examination, having presented certain credentials. This part is unobjectionable; but here again, recent developments have indicated a tendency to restrict, by legal enactment, the performance of major surgical operations by those not members of this "College." Already we are told by those in touch with the conditions in country communities, there is a retrograde effect upon the standing of the country practitioners by virtue of the more elevated standard of medical education. Formerly many of our most distinguished men have been country doctors and surgeons. McDowell, who performed the first successful ovariotomy, was a Kentucky country surgeon. Many country boys, with plenty of determination, but with little cash, have gone back to the country when they have received their degrees, and there have been powers for good. Ian MacLaren has drawn a fine picture of such an one in his

Doctor of the Old School—MacLure. Now with the raising of the standard so that so much more time and money are required for the obtaining of a degree, the successful candidate is less inclined to take the smaller income of the country doctor. He leaves that field for those who have obtained their licenses by less expensive routes, while he remains in the city, there hoping the more quickly to obtain interest on his investment, and eventually a chance at big fees. These new suggestions for additional time, or special society membership, neither insure greater competence, nor are likely to be for the good of the nation as a whole.

Public health, then, is a new profession, as well as a new science. An education in a college of liberal arts, or of law, or of medicine, would each and all of them be good preparation for this profession, but it is not an additional degree in either. There is no other profession which to-day presents a more alluring opportunity — not for the commercially inclined, but for the real lover of science and

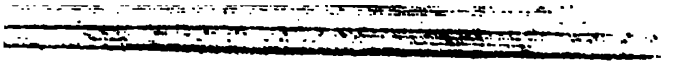
of humanity. There is none other which affords such frequent chance for doing good. There is none which more perfectly epitomizes the essence of the Christian religion. It wields its sword in the defense of innocent children; it wards off the thrusts which are made at the heart of the poor; it strengthens the weak; and it offers the refreshing sip of cold water to the parched throat, with assurance that it contains no poison-producing germ. But, just as the knight of old sometimes received the fatal blow intended for the women and children at his back, so the modern knight sometimes falls a victim to the darts and arrows of the disease which he is fending from those dependent upon him. When this happens, he dies as he has lived—unselfishly, and for the good of his fellow men.

THE END



INDEX

INDEX



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